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# QUARTERLY

OF THE

# National Fire Protection Association

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# National Fire Protection Association

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*Over 4,000 Associate Members.*

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# Table of Contents.


CONEY ISLAND CONFLAGRATION ..... FRONTISPIECE

EDITORIALS ..... 105

INDIANAPOLIS FIRE DEPT. EXHIBIT AT STATE FAIR ..... 111

BOARD OF DIRECTORS' ACTION ..... 112

THE CONTROL OF INCENDIARISM. *George W. Smith* ..... 113

CO-ORDINATING MUNICIPAL FIRE PREVENTION EFFORT. *Thomas Larke, Jr.* ..... 121

THE CONEY ISLAND CONFLAGRATION. *New York Board of Fire Underwriters* ..... 129

TESTS ON NITROCELLULOSE FILM CABINETS. *A. J. Steiner* ..... 143

BREMO BLUFF POWER PLANT FIRE. *South-Eastern Underwriters Association* ..... 151

CHICAGO ELEVATOR AND PACKING HOUSE FIRE. *Chicago Board of Underwriters* ..... 157

ST. LOUIS BUS GARAGE EXPLOSION AND FIRE. *St. Louis Fire Prevention Bureau* ..... 163

SUPERIOR REFINING CO. FIRE, ST. PAUL. *John Townsend* ..... 165

AUBURN, N. Y., CHURCH AND MASONIC BUILDING FIRE ..... 171

MERCANTILE FIRE RECORD ..... 172

- DRY GOODS STORES ..... 177
- FURNITURE STORES ..... 179
- GROCERIES ..... 181
- GENERAL STORES ..... 183
- HARDWARE STORES ..... 185
- SHOE STORES ..... 187
- MISCELLANEOUS MERCANTILES ..... 188

FIRES IN WHICH THERE WAS LOSS OF LIFE ..... 191


*Reports of fires appearing in the Quarterly are copies of or extracts from written reports forwarded to the Association. This Association, as a body, is not responsible for the statements or opinions of any of its members.*

The Coney Island Conflagration, July 13, 1932. The loss is estimated at between three and five million dollars. Several hundred families were made homeless and a large number of bathers lost their clothing, money and personal effects when bathhouses were destroyed. (See report, page 129.)

# The Quarterly

Vol. 26 October, 1932 No. 2

**The Cost of Fire Safety.** The cost of fire protection is under attack in many places, as a part of the general movement for reducing governmental expenditures. The public has become so accustomed to enjoying the benefits of fire protection that some individuals apparently fail to realize that eliminating expenditures for fire protection will inevitably eliminate its benefits.

The cost of fire-safety is a necessary expense for the maintenance of our urban civilization. Without fire departments, water supplies for fire protection, and legislative control of the combustibility of buildings and their contents in the congested districts, it would not be long before conflagrations would practically wipe out every one of our large cities. It is doubtless true that in some cases the cost of fire protection has been too high for the results obtained, fire department and water supply expenditures have not given full value, and code restrictions have operated to increase building costs without proportionate reduction in the combustibility of congested districts. But where there has been such lack of efficiency it has been in many cases due not to excessive expenditures, but rather to a short-sighted economy that has not seen the problem in its larger aspects and has refused to spend enough for municipal fire safety to secure satisfactory results. Examples may be observed in most cities — heavy expenses for fire departments not effective in reducing the fire loss because of an unwillingness to spend a slight additional amount for a fire prevention bureau and an arson squad; extensive water supply systems not fully effective for fire protection because of a few weak links in the distribution systems; building construction seriously handicapped by an obsolete code that could be revised at relatively small expense.

It is right and proper that the maximum efficiency should be sought in all municipal expenditures for fire protection and related matters, but measures of economy should be undertaken only on the basis of complete knowledge of the problem. N.F.P.A. members who are in a position to influence municipal planning for the coming year can render no greater public service than to see that the allotments for fire protection expenditures in 1933 municipal budgets do not represent blind reduction in expense, but rather true economy that secures full value for every dollar spent.

**Fire Prevention Week 1932.** Fire Prevention Week 1932 according to the indications of preliminary correspondence and the distribution of Fire Prevention Week literature will equal, if not surpass, any previous observance. This result is particularly gratifying in view of the status of business conditions and the virtual cessation of many types of activity. The continuing interest in Fire Prevention Week shows the extent to which Chambers of Commerce and other business organizations recognize the essential character of the observance. The year 1932 puts Fire Prevention Week to a severe test which it has come through with the greatest success, proving that Fire Prevention Week is unquestionably to be regarded as a permanent institution.

Fire Prevention Week observances involve negligible expense in proportion to the benefits to be derived, but there is nevertheless in most cases a definite cash outlay. The N.F.P.A. Fire Prevention Week literature, for example, is sold at nominal prices to cover the printing cost. While the total amount is not large, it seems very significant that this literature has been sold in considerably greater volume for the 1932 campaign than in the previous year.

* * * * *

**The Hazard of Electrical Economies.** In these days when practically every householder is seeking ways and means to economize, the amateur electrician has an added incentive, and cheap electrical devices that do not meet recognized standards are apparently being sold in increasing quantity. The effect upon the fire loss is clearly shown by the following report from one of our members covering fires occurring in a short period in a small suburban community.

Case No. 1. Mr. Tie. Mr. Tie's family loves comfort and convenience. Their home was equipped with an elaborate annunciator system with push buttons at the front, side and back doors, with other buttons in the dining room, living room and upstairs. Dry batteries furnished the power. There was evidently a high resistance short somewhere on the system, requiring battery replacements every two or three weeks. Batteries cost money. The chauffeur volunteered to end the trouble, and impressed by the economy drive of the head of the house, purchased, for 98c, a bell-ringing transformer that nobody had approved and evidently not even the manufacturer, because no identification appeared thereon. Ordinary silk covered lamp cord was used to connect the primary to the main 110-volt supply, but the connection was made on the live side of the fuse panel, so the primary of the poor little 98c transformer had no safety valve between it and the power house. The high resistance short on the annunciator wiring was not detected nor cleared.

On Sunday morning the head of the house left home at 4:00 A.M. on a trout fishing expedition. At 7:20 a maid who slept out reported for work, and following her usual custom attempted to gain entrance to the kitchen door, but found the rear of the house a seething cauldron of flame. Her screams aroused a neighbor who turned in a fire alarm. Mrs. Tie evidently was aroused at the same time and quite naturally came downstairs

and proceeded to the back of the house to see what was burning. The firemen had great difficulty in rescuing her from the smoke and heat filled dining room. An ambulance surgeon worked over her for more than half an hour before restoring life. Careful investigation indicated that the fire originated on the cellar ceiling at the place where the "economy" transformer had been installed.

CASE No. 2. The monthly electric service bills were high. The boy of the family had received some lessons in elementary electricity in high school. He determined to do his bit in the economy program. He rigged up a separate line on the outside of the meter to run the laundry equipment. The laundress attempted to put a heavy wet woolen blanket through the mangle. It stuck. She abandoned the operation but did not turn off the motor. At 2:30 A.M., the following morning, the milkman saw a vigorous blaze in the basement and turned in an alarm. The family was sound asleep upstairs. Damage was trifling, but circumstances might not always furnish a milkman to discover the result of an unintelligent economy move.

CASE No. 3. Not only are there fire hazards in economy moves, but unintelligent use of electricity for toys has proven to be a contributing factor. Last Christmas Santa Claus brought a little girl a toy electric iron and up until the latter part of June the little 8-year-old maiden had pressed dollies' clothes at least once a week with no result other than what the fond parents thought was educational amusement. One day last June little Evelyn plugged her toy electric iron into a baseboard receptacle and it did not heat up as usual. Just then a playmate called her outside to play on the lawn and in disgust toward her educational toy she threw it down on her bed and proceeded to play, while the toy for some unknown reason proceeded to heat up. Their play was interrupted by dense smoke of the burning bed clothes emitting from the window. Again the prompt work of the municipal fire department minimized the loss. Electricity coming from the 110-volt supply sometimes proves to be a most hazardous thing when used and directed by not only the young but those who are supposed to be of more mature age.

CASE No. 4. A new bracket light was wanted. Of course, outlet box and BX were to be used. No open knob and tube work for this gentleman. He knew a thing or two, but the electricians charged such high prices that he would economize and do the work himself, but in fishing the BX in a wooden lath wall he miscalculated and the armored part of the BX was short about 1½ inches, so that the armored part of the BX was not locked into the iron box outlet, but the wires were long enough and the fact that they were exposed through the knockout hole did not mean anything to the amateur electrician. Had he not used standard BX and an iron outlet box? The BX was not fastened in the wall but had a free vertical play like an inverted pendulum of about 4 ft. The house was old and any movement on the second floor caused some vibration, and the rubber and braid insulation of the two wires rubbed against the edge of the knockout hole and a high resistance short was finally established. The fuses in the basement repeatedly blew and a crimped hairpin was substituted.

One evening when the little 9-year-old son, who was left alone for the evening, retired to his room he could not light the bracket light, but he did notice that the wall was uncomfortably hot. The little fellow telephoned the operator that "the wall in my bedroom is hot." In a few seconds a city fire company investigated and found the wooden lath emberized, just awaiting the admission of a sufficient supply of oxygen to turn this economy drive into perhaps a fatality.

It is probable that fires similar to those described are occurring throughout the United States, although owing to the general lack of facilities for the expert investigation and reporting of dwelling fires, the situation may not be

generally realized. Electrical inspectors realize the seriousness of this hazard, but except in those communities where the inspector has the power to prohibit the sale of substandard electrical equipment there is little that can be done except through public education and systematic reinspection.

* * * * *

**Nitrocellulose Film Fires.** No major fire catastrophe has been chargeable to the nitrocellulose film hazard in the United States and Canada during recent months. Lest the hazard be forgotten and precautions relaxed by a complaisant public, it is well to call attention to a fire recently reported from Chile. It is a typical example of the potential hazard existing wherever nitrocellulose film is used without proper precautions.

A motion picture performance attended largely by children was in progress in the Esmeralda Theatre in Talcahuano, Chile, on the afternoon of July 3, 1932. The film ignited, panic followed the cry of "Fire," and 21 children were killed and many were injured. According to the reports received from local sources, a standard projector was used in a fire-resistive booth. Advices received by the Executive Office, however, are not sufficiently detailed to permit drawing conclusions as to how the projection equipment, the booth and the theatre arrangements would compare with North American standards. It is probable that exit arrangements proved inadequate to meet panic conditions. Whatever the detailed explanation, we have here another frightful example of the danger of the nitrocellulose film where all possible precautions are not taken.

In contrast to the above is a recent fire in a film exchange reported by Mr. A. S. Dickinson of the Motion Picture Producers and Distributors of America (member N.F.P.A.). Mr. Dickinson's report (with identifying names and places omitted) reads as follows:

On Wednesday an inconsequential fire occurred in one of the inspection rooms of the ———— Exchange. Approximately 60 feet of film was destroyed, at an actual monetary loss of something less than $1.00. The circumstances of the fire are as follows:

A "playful inspectress" handed another inspectress a trick cigarette lighter, shaped like a small bottle with the words "Have a drink out of my bottle." The other inspectress, compelled by curiosity and not knowing what she had in her hand, removed the stopper, and it immediately sparked and ignited some film.

The fire was quickly put out, with the only loss as above noted. In the meantime the exchange fire alarm had been sounded and the entire exchange was cleared in less than 15 seconds, excepting two shipping clerks who were assigned to the fire extinguishers. Within fifteen minutes all trace of anything unusual had disappeared, and all departments were again functioning as if nothing had happened.

The training given to the exchange employees during the inspections and fire drills served its purpose 100%. Immediately upon the film being ignited all other film was covered and everyone knew exactly what to do and how to do it.

Needless to say, the "playful inspectress" was immediately dismissed.

In years gone by the motion picture exchange presented one of the most serious hazards of American cities. This hazard still remains in a small num-

ber of exchanges, as witnessed by a recent fire in a Boston film exchange which did heavy damage but fortunately involved no loss of life or personal injury. The exchanges which have observed full fire prevention precautions in accordance with the program of our member, the Motion Picture Producers and Distributors of America, have experienced a remarkably good record in recent years.

* * * * *

**Cleaning Floors with Gasoline.** Two magazines of large national circulation have recently published material on the care of floors that advises the use of gasoline to clean before refinishing. Our alert member, Chief L. S. Jones, head of the Bureau of Fire Prevention of the Richmond Fire Department, has called attention to the seriousness of the hazard in a letter to the Executive Office from which the following is quoted:

October 3rd, 1932.

Here in Richmond we have had a great number of fires from this use of gasoline and also several deaths. We have about broken up this practice here, as our Code prohibits its sale without a permit unless into auto tanks, and most dealers keep safe solvents to sell for such purposes, but when people read such articles as this in a reputable magazine they think it O.K., and if they cannot buy it they will get it out of their auto tanks.

Sometime ago here in Richmond some one asked in the Query Column, "What is good for cleaning old furniture and floors?" The newspaper advised the use of gasoline and mineral wool. A credulous citizen read this and proceeded to use the gasoline as directed, causing a fire and an alarm of fire. When we got there the whole of the second floor was blazing, and the family had to be gotten out the second story windows. The baby was burned to death and the rest of the family had to be taken to the hospital. This is just one incident that occurred right here and I could quote a number more, some where death resulted and many where serious burns were inflicted and more where the building was fired.

It is amazing that supposedly intelligent editors should publish such advice, and equally amazing that it should be so often followed.

INSURANCE IS ONE OF YOUR TAXING UNITS YOU CAN REDUCE THIS YOURSELF BY HELPING TO PREVENT FIRES
FIRE PREVENTION BOOTH
INDIANAPOLIS FIRE DEP'T
THE YEARLY FIRE LOSS IN THE U.S. IS $500000000 AND 10000 TO 15000 LIVES ARE LOST 75% OF THIS LOSS IS CAUSED BY PREVENTABLE FIRES
SAFE
DANGEROUS
SAFE
DANGEROUS

Exhibit of the Indianapolis Fire Department at the Indiana State Fair, September 3-9, 1932. This picture, supplied by the courtesy of Chief Harry E. Voshell of the Indianapolis Fire Department and Chief Bernard A. Lynch of the Division of Fire Prevention, shows the booth at which a total of **48,666** persons received instruction in fire prevention. The small structure at the left shows safe and dangerous roof and chimney construction, a hazardous kitchen range and other kitchen hazards, including an ironing board where an electric iron started a fire, bearing the sign. "This occurred in 5300 Block on North Jersey Street. Be sure you disconnect iron before leaving, or this may happen to you." Other home hazards are likewise illustrated. The doorway in the right center leads to a tent arranged as an auditorium with a seating capacity of **360** persons, where fire prevention motion pictures were shown from **9 A.M.** until **10 P.M.**, with lectures on home inspection given at intervals.

# Indianapolis Fire Dept. Exhibit at State Fair.

Fire prevention exhibits at state and county fairs afford excellent opportunity for fire prevention education. The recent Indiana State Fair presented just such an opportunity for the fire department to bring the attention of casual passers-by to the importance of fire prevention.

On September 3, 1932, the first day of the State Fair, officials of the fair requested a detail of men from the fire department to be on duty for the duration of the fair. Chief Voshell of the Fire Department responded by putting Chief O'Brien in charge, and assigned Pumper No. 20 to the fair grounds. A fire prevention booth was set up in a tent with a seating capacity of 360. In the front of the tent thirty-one major hazards found in the home were displayed, including home dry cleaning, electrical hazards, flues, stoves and stovepipes, open bonfires, rubbish, careless handling of ashes, kerosene for lighting fires, wooden shingle roofs, matches–smoking, etc. All of these hazards were displayed in such a manner that even the smallest child could understand. Approved methods for preventing such hazards were similarly displayed. Twelve reels of fire prevention film were shown continually from 9 A.M. to 10 P.M., and lectures were given at intervals on home inspection and the proper way of calling the fire department. During the period of the fair 48,666 people viewed the exhibit. The display was arranged by the firemen, using exhibits loaned by Indianapolis merchants. The space was donated by the State Board of Agriculture, and the expense of the entire exhibit was negligible.

In addition to the fire prevention booth, the fire department men were assigned to inspection work on the fair grounds. Extinguishers were placed in the most hazardous places and the firemen instructed employees in their operation. Inspections were made twice daily of all buildings and grounds. Of a total of 756 inspections, 672 showed satisfactory conditions and 84 orders were given for the correction of such hazards as open gasoline containers, gasoline and kerosene stoves, stoves and stovepipes, rubbish, improper parking and exit facilities, rubber tubing on gas hot plates, and the draining of gasoline from automobiles in the Manufacturers Building. Recommendations were made on subjects such as exits and the replacement of frame buildings by fire-resistive structures.

Excellent coöperation on the part of all exhibitors was secured, and the Boy Scouts, who served as ushers, were instructed what to do in case of panic. The firemen responded to only one fire during the week. The interest displayed in the exhibits and the general coöperation secured from the officials of the fair and from the exhibitors furnished convincing proof of the value of this activity by the Indianapolis Fire Department.

# Board of Directors' Action

Since the last meeting of the Board of Directors, QUARTERLY July, 1932, page 9, action has been taken by letter ballot on proposals submitted by two technical committees as follows:

**Committee on Garages.**

Subsequent to the June meeting of the Directors questions arose as to the intent of certain sections of the 1932 report of this committee dealing with the ventilation of garages (Proceedings 1932, page 302). The committee accordingly submitted the following changes in text which have been approved by the Board of Directors.

Revise the first line of Section 12 (a) to read as follows: "Basement and sub-basement garages shall be *continuously ventilated by* a mechanical ventilating system, etc."

At the end of Section 12 (a) add an additional sentence reading as follows: *"The ventilating equipment may be combined with the heating system, which is governed by Section 22."*

In Section 22 (b) add the following sentence to Par. 3: *"This provision does not set aside the ventilating requirement of Section 12 (a) for basement and sub-basement garages."*

In Section 23 (a) revise the first or opening sentence to read as follows: "The following garages shall be provided with *means for the occasional ventilation made necessary from time to time by operating conditions, and* in compliance with the provisions hereinafter set forth."

Revise the first sentence of Section 23 (b) to read as follows: "Natural ventilation may be employed where practicable to maintain open windows or other openings at *any* time."

**Forest Committee.**

During the preparation of the 1932 report of the Forest Committee (Proceedings 1932, page 118) it appeared that reliable data were lacking on the types of forest fire equipment covered by the report and that there were wide differences among forest fire authorities as to the performance which should be expected from small pumping units. Representatives of the U. S. Forest Service suggested that demonstrations of the operation of the equipment of different manufacturers are needed to permit the committee to bring its present work to a satisfactory conclusion and also that such demonstrations would be valuable in educating state forest fire authorities. The Board of Directors has authorized the Forest Committee to proceed with such a program with the understanding that it is to be in the nature of a demonstration for the benefit of the committee and state forest authorities and is not to take on the character of an official test.

# The Control of Incendiarism.

By George W. Smith,
Detective Sergeant in charge, Detroit Police and Fire Departments' Arson Squad.

In the latter part of 1921, when it again became evident that Detroit's annual incendiary fire loss was nearing the million dollar mark, public sentiment demanded that some special effort be put forth to combat this ever-growing evil, which had developed into a seemingly well-established and flourishing business. Throughout the underworld of the larger cities of the country it became known that Detroit was a lucrative field for professional fire-bugs, particularly those who made a practice of defrauding insurance companies of large sums of money in this manner, also for persons who used fire as a weapon in bringing certain tradespeople to terms in promoting some of the many so-called "rackets" which were in existence. Therefore, Detroit was in the throes of one of America's largest arson rings. "Torches" could be procured for any job for $50.00 and upwards, depending on the size of the home or business to be burned and the amount of insurance involved.

This condition did not exist as the result of any particular laxity on the part of those whose duty it was to see that fires were properly investigated and arsonists prosecuted, but rather the failure of city officials to realize the seriousness of the situation, including the continued increasing costs to the public in insurance premiums. Insofar as local authorities were concerned the load fell almost entirely on the shoulders of the Fire Marshal, who was already overburdened with the many other duties of his office. Apparently to all others all fires were considered strictly a matter to be adjusted between the fire insurance companies and the assured. In other words, what should have been everybody's business seemed to be nobody's business.

A careful analysis of the above conditions by the Police and Fire Commissioners resulted in the organization of an Arson Squad, composed of men who could devote their entire time to the investigation of fires and preparation of arson cases for trial.

In a general survey made by this squad it was found that a large percentage of fires were of incendiary origin due to many reasons, chief among them being the lack of a systematic method of investigation. Several investigating agencies, all under different heads representing separate interests, were attempting to investigate the same fire at the same time, with the aim of bringing credit to their own organization in the event a conviction was obtained, with the result that convictions were rare.

A close inspection of certain types of merchandise revealed that stocks were moved from one location to another and were being paid for over and

over again by insurance companies. Public adjusters were ever present at the scene of these fires and were a valuable asset to the assured in preparing false claims and otherwise acting in an advisory capacity. Company adjusters, while not wishing to deliberately overpay losses, were liberal in the settlement of these claims, having no alternative except subjecting their companies to civil suits, which invariably resulted in added expense to them, as juries were inclined to decide against them where no evidence of incendiarism was produced.

Our Arson Statute was found to be entirely inadequate, having been passed in 1845. The many fire prevention organizations in existence apparently gave no thought to the elimination of incendiarism as a partial solution of our fire loss.

With conditions such as these and many others of like nature existing, it was very evident that if our incendiary fire loss was to be reduced to any appreciable degree there must be a complete coördination of all interested and necessary organizations, committees and individuals into one large unit, and a thorough scientific investigation of fires. This was brought about through meetings with the many insurance representatives, Police and Fire Department officials, the Fire Prevention Committee of the Board of Commerce, the Prosecuting Attorney, Courts, etc. A new Arson Statute was drafted and passed, which prohibits the wilful and malicious burning of property, personal or real, whether it be insured or not. Regulations for the conduct of public adjusters, specifying hours for the solicitation of losses, fees to be charged, etc., were put into effect by the State Insurance Commissioner, and many other steps were taken in an effort to eliminate the several obstacles which had hindered the successful prosecution in previous cases.

As a result of this, the first year our squad was in existence nine persons were convicted of arson, being a greater number than ever recorded in the entire history of the city. The number of incendiary fires decreased by 46% and the loss due to them was reduced 60%, or approximately one-half million dollars. The following year the incendiary loss was again reduced 30% and the average yearly loss since then has been approximately $210,000.00.

During the year 1931 there was a very noticeable decrease in incendiary fires from all motives, except that of "to defraud insurance companies," which showed an increase of 106% over the previous year. This without doubt can be attributed to two causes: the general business depression, which prevailed throughout the year, and the fact that a great number of those persons involved in the fraud fires had previously had a large number of fires in this city, a great majority of which were of incendiary origin, indicating that they are still able to obtain fire insurance regardless of their previous fire record. During the same period 1,366 fires were investigated, 63 arrests made and 16 convictions obtained.

All arson cases are now attacked from a police viewpoint exclusively, the same as other serious crimes where the proofs depend largely on circumstantial evidence. Photographs are taken at the scene of the fires, evidence submitted to the City Chemist for analysis, diagrams prepared by the City Engineer, insurance policies, books and records of the assured seized, from which audits are made, inventories and appraisals made when necessary, all of which are submitted as proofs in the case.

It is generally conceded by all law enforcing agencies that it is more difficult to obtain conviction for arson than any other major crime, due to the fact that direct proofs can seldom be produced, and the further fact that the necessary evidence to establish the *corpus delicti,* or proof that a crime has been committed, is, in a large majority of cases, consumed by the fire. There has been great stress laid on these points by many well-informed persons, in fact so much so that some of those whose duty it is to carry on this work have come to the conclusion that their job is much more difficult than it really is.

The *corpus delicti* can be established by circumstantial evidence; in fact even where there is no physical evidence of foreign substances having been used to start the fire. In a recent case in this state where a fire occurred in a vacant house and burned rapidly up the walls and through the roof, our Supreme Court ruled that inasmuch as the building was vacant, the possibility of a fire originating from the ordinary causes in an occupied building was very remote, and furthermore testimony disclosed the fact that the place and manner in which the fire originated and burned indicated that some highly flammable substance, for instance gasoline, was used, although no evidence of gasoline was found at the time of the fire. In further commenting on this case the Court stated that the *corpus delicti* could be established by circumstantial evidence and that neither the drawing of inferences nor the weighing of probabilities should be barred. There are similar rulings by the Supreme Courts of many states. In another case recently tried, where a motion was made by counsel for defense "to quash the indictment and discharge the defendent," and where the only proofs offered were of a circumstantial nature, the Court remarked that it was very evident that our Supreme Court had begun to realize more and more that, in proving the crime of arson and particularly in establishing the *corpus delicti,* more leeway must be granted the People, due to the very nature of the crime and the almost impossibility of persons being apprehended in the act of committing the offense.

It has been the complaint of many investigators of arson cases that even though they were able to establish the *corpus delicti* in some cases they were unable to prove that the defendant set the fire or was actually present at the time the fire occurred or conspired with others to commit the offense. This fact is appreciated and no doubt many cases have been dismissed on these grounds, as the criminal statutes of most states provide that one of these

1. Exterior view of apartment house, also a number of the cardboard cartons taken from the attic, which were lined with cellophane and filled with gasoline.

elements must be established. However, the modern and progressive court has come to realize that progress of time and science has made available to the arsonist many means by which it is possible for him to set a fire and be far removed from the scene at the time it really breaks into flames and is discovered. Due to this, persons who set fire to their own property or employ others to do so are seldom near the scene for at least several hours prior to the fire, for the purpose, of course, of being able to establish an alibi that they were elsewhere.

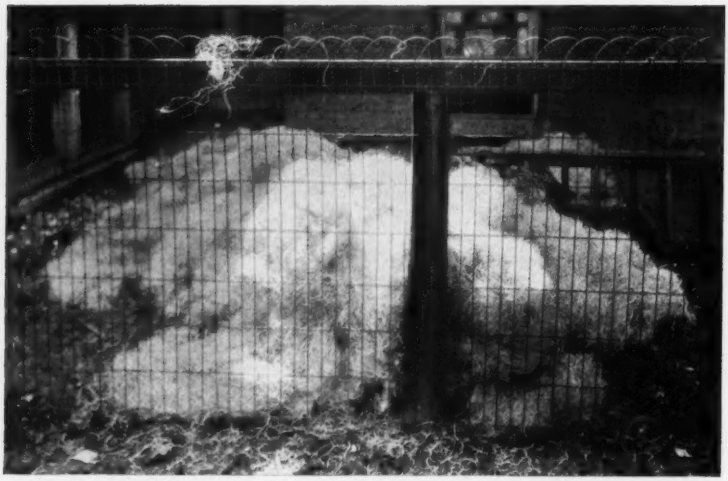
This within itself does not indicate innocence and neither does it prove guilt, but if the case runs true to form, as the majority do, investigation will no doubt disclose this particular absence from home or business to be an unusual one. This, connected with the fact that a set fire has been proven, with the suspect the only individual having access to the premises and a motive, and other circumstances which will develop in the case, should be sufficient to obtain a conviction. In a very similar case, where the defendant proved by competent witnesses that he was several miles away when his home burned, our Supreme Court held that in this day of modern fire making it would have been highly possible for the defendant to set the fire and be even farther away than he proved himself to be when it broke into flames.

The following case is of interest as a further illustration. On May 13, 1932, at 11:50 P.M., a fire was discovered in the flat attic of a two-story and

**2. A close-up view of the same cartons as shown in No. 1.**

basement brick apartment house at 3545 Wabash Avenue, Detroit. Upon the arrival of the fire department it became necessary to remove the lath and plaster ceiling of the second floor in order to reach the fire. When this was commenced, burning gasoline came streaming down on the heads of several firemen, who barely escaped being seriously burned. After the fire was extinguished firemen found approximately two hundred and fifty cardboard cartons of about four gallons capacity each, lined with three layers of cellophane and filled with gasoline, also the remains of several bales of excelsior. It required four hours for eighteen firemen to remove these articles from the building. Members of the Arson Squad who responded to the fire immediately began a search for the owner. It was learned that he had left eight hours previously for Port Huron, Michigan, sixty-five miles away. He was arrested there at 2:00 A.M., approximately three hours after the fire, and denied all knowledge of it.

Charges of burning the building to defraud fire insurance companies were preferred against him and the proofs were as follows: That he built the building in 1927 at a cost of $50,000.00, which had depreciated to $34,000.00, and that the above described condition existed in the attic at the time of the fire. There was $49,000.00 fire insurance on the building, also a mortgage in favor of a local bank in the amount of $19,000.00, with approximately $6,000.00 in payments overdue which he could not meet. Therefore, foreclosure proceedings were inevitable in the very near future. These were the only proofs offered by the People, but they established a set fire and a motive on the part of the defendant and no one else. In view of this he was convicted and sentenced to ten years in prison, despite the fact that he was sixty-five miles away from Detroit for at least six hours before the fire occurred. Afterwards he stated that he alone had made all the preparations for the fire



3. A portion of the gasoline-soaked excelsior removed from the attic by firemen.

and the setting of it through a timing device, without the aid or knowledge of any one.

It is common knowledge that it is not compulsory on the part of the People to show motive in an arson case, but it should never be forgotten that motive is always a large factor in securing a conviction. For instance, in the case just cited, if the owner could have caused a total loss to the building and collected insurance to the amount of the present day value, $34,000.00, he could have paid off the mortgage and have left $15,000.00 in cash and a valuable building lot. The fact that the building was not completely demolished by an explosion and fire was certainly no fault of his, as he had planned what he thought was the perfect set-up, and having always been successful in life's adventures, he was confident of the success of his plan. But despite the amount of thought, time and energy put forth in his preparation he overlooked a seemingly trivial but rather important detail which made it almost impossible for an explosion to occur or for the fire to burn with any greater rapidity. The attic was practically sealed closed, which prevented the entrance of sufficient oxygen to produce the necessary combination of oxygen and gasoline vapors to create an explosive mixture.

With further reference to proofs, there is in addition to direct and circumstantial a third type of evidence, which deals with identification exclusively, that is known as finger print evidence. While it is true that fire or even a small amount of heat will destroy finger prints, which lessens the possibility of finding them at the scene of the fire, at the same time there are

many cases in which the identity of the criminal can be positively established by having a finger print expert make an examination of the premises and bits of evidence before they are handled by firemen and others.

Only a few short years ago the introduction of finger print evidence in a court of law was regarded as a somewhat sensational procedure, and when a conviction was obtained as a result of identification through the prints introduced there was much comment by the press. However, the science has been so developed and proven so nearly devoid of error that it is now considered as commonplace. Several convictions for arson have already been obtained throughout the country where finger print evidence was the major factor in proving the People's case.

"Unknown"—the one word so frequently seen and heard with regard to the origin of certain fires certainly covers a multitude of sinful fires. Tacked on to an investigator's report, it has a tendency to intimate to all who might read that through some mighty act of Providence the property was smitten and devoured by fire. While this may be true in some isolated cases, ordinarily proper investigation of this type of fire will disclose otherwise. Determining the cause of fires from accidental origin seldom presents a difficult problem. This is likewise true of incendiary fires where physical evidence of incendiarism is present, but they both differ from the so-called "unknown" fire, which, on the surface, is usually void of anything which would indicate the exact cause, although careful investigation by a trained mind in many cases will reveal it as the work of an exceptionally clever fire-bug. In this one word "unknown" is hidden the remainder of the nation's incendiary fire loss, which, were it possible to produce figures, would probably be many times the amount of the annual incendiary loss now reported.

There has been great progress made in fire investigation in the past few years—hundreds of local arson squads have been organized, several states have either amended or passed entirely new arson statutes whereby convictions are obtained with less difficulty, and many other steps taken, too numerous to mention, to combat the arsonist; yet the surface of the country as a whole, in this respect, has hardly been scratched. We who are engaged in fire investigation and fire prevention are primarily interested in two objectives, viz., first, the apprehension and conviction of arsonists, and second, the elimination of the nation's fire waste insofar as possible in order that our citizens may enjoy the protection of sound fire insurance at a nominal cost. If there are to be any startling accomplishments in this field of endeavor in the near future, whereby numerous lives could be saved and millions of dollars saved by the insurance-buying public, it is absolutely essential that all interested bodies unite themselves into one large organization working in complete harmony towards this—the elimination of at least 50% of the nation's fire waste.

An important step in this direction would be the organization of a national association of arson squads and associated bodies. Such an organization would provide the means for an exchange of ideas, in the formulation of plans for most effectively combating arson, informing the public of the real facts and reminding them that they pay the bills, gathering and keeping on file reliable statistics as to what cause is responsible for our astounding fire loss, determining what factors, both primary and secondary, contribute most largely to incendiarism and in what proportions, interchanging information, photographs, etc., regarding known arsonists, standardizing the work of fire investigation and the prosecution of arson cases. When these things are done, and fire department officials come to realize that there are three major agencies involved in eliminating fire loss, namely, Fire Extinguishment, Fire Investigation and Fire Prevention, and when sufficient institutions are provided for the housing and treatment of pyromaniacs there will, no doubt, be a noticeable decrease in our incendiary fire loss.

It is appreciated that the primary purpose of a fire department is to extinguish fires, but the old-time fire chief whose promotion was gained exclusively on the strength of how many fires he extinguished instead of how many he prevented is now antiquated.

Far be it from me to underestimate the value of the great work done by fire preventionists. Without question they have been responsible for the saving of millions on millions of dollars, but unfortunatly this particular type of education of the public at large is only acceptable to that portion of them who do not want fires under any circumstances and it certainly has no effect on those who would welcome a fire or who are constantly planning and scheming some method by which they might bring one about. There is only one way to deal with these individuals and that is through a uniformity of laws, thorough investigation of all fires and diligent prosecution of those involved.

# Co-ordinating Municipal Fire Prevention Effort.

By Thomas Larke, Jr. (Member N.F.P.A.),
San Francisco Fire Prevention Commissioner.

Municipal authorities have only in recent years generally recognized that fire prevention is a proper function of city government and therefore no standard methods of organization have been put into general practice. Each city has its own problem and conditions, and methods which would apply to one would not necessarily be successful in another. This article, which is intended to cover some of the fundamental principles of municipal fire prevention, is based upon the experience of the author, who has studied the methods and conditions in many cities, principally those on the Pacific Coast and most particularly San Francisco. Fire prevention is only one of the several basic divisions of municipal control of fire. It should not be inferred that any one phase of the various fire department functions is to be given a greater value than others.

For our efforts to have a marked and permanent effect on the fire losses of a city there must be intelligent, conscientious, and most important of all, continuous effort along constructive lines. Therefore it is important that within the set-up of the municipal administration there be the machinery and means provided for carrying out this most important function—that of preventing fires.

In most cities the set-up of the municipal government under its charter from the state is such that several departments or officials are concerned in one way or another with the prevention of fires. The Building Inspector enforces the Building Code, which, among other things, often provides for the safeguarding of fire hazards arising out of the use of heating apparatus and restricting the spread of fire by means of fire walls and enclosures; the Electrical Inspector sees that electric wiring and equipment are safely installed; the Fire Marshal or Warden may have charge of oils, gasoline, explosives and films; the District Fire Chiefs may issue permits for burning rubbish; the Police Department may enforce laws regarding accumulations of rubbish, securing vacant buildings and the like; the Health Department, through its sanitary functions, may be an important factor; and lastly, though unfortunately often *least*, the department most interested and on account of experience best qualified to handle these matters, has in many cases little, if anything, to say. I refer, of course, to the Fire Department.

To make matters worse, the set-up is often such that several departments are interested in the same thing, with the result that the owner or occupant of a building may be given conflicting instructions by different city officials, each

of whom may be able to show where his authority is justified by this and that section of the city charter or ordinances.

Is it not logical to conclude that a Fire Prevention Board or Commission would be a valuable addition to any city administration? Such a board might be created by ordinance or simply by order of the mayor, to coördinate the efforts of the various city departments along fire prevention lines, to hear suggestions or complaints from citizens, and possibly to act as a Board of Appeals in cases affecting fire hazards, thus saving the expense of court appeal by a property owner or occupant who feels that he is being unjustly treated.

In addition, the Board could study the subject of fire prevention in general as it applied to the city, and recommend to the legislative body or the administrative head such measures as, in its opinion, would result in a decrease in the number of fires breaking out. It might be official or unofficial; with definite powers or merely advisory; appointed or elected; volunteer or paid; composed of existing city officials or citizens; the point is, however, that there should be such a body which could render valuable service to any community along fire prevention lines, through its coördinating effect.

But why have a Fire Prevention Board as part of the city government when the local Chamber of Commerce has a Fire Prevention Committee? From considerable experience along these lines, my answer is that the Fire Prevention Board, being part of the administration itself, has an entirely different function—that of coördinating the efforts of the various city departments having to do with fire prevention. As a matter of civic duty, *every* civic organization of an unofficial nature, such as the Parent-Teachers Association, the various neighborhood improvement clubs, the luncheon or service clubs, and so forth, should have an active Fire Prevention Committee. The principal functions of such committees should be to inform and educate the members of their own organizations and the public along fire prevention lines and to support the Fire Chief, the Fire Marshal, the Fire Prevention Bureau of the Fire Department, and the Fire Prevention Board in the accomplishment of worthwhile projects along the lines of fire prevention or fire protection.

### Fire Department Inspections.

Although it is important that all fire prevention effort be coördinated, it is even more important that there *be* some fire prevention effort. To depend solely on volunteer committees of civic organizations or on the insurance organizations is unwise, because permanent results are not to be obtained in this way.

Fire department inspections are made primarily for two reasons. First, to bring to light conditions which are liable to cause fires, and secure their correction, and second, to familiarize the officers of the fire department with the layout of buildings so that they may fight fires therein more effectively.

Inspections falling in the first category should be made periodically by a Fire Prevention Bureau within the Fire Department. They usually will not be effective as a preventive measure unless they are made at least once each six months. It is difficult to arrive at the number of inspectors required to accomplish this, but probably in most cases it can be done if there is one inspector for each 15,000 to 25,000 of population. This refers, of course, to all buildings other than private dwellings. With a bureau for a city of 250,000, this would mean at least ten inspectors, in addition to the office staff and the officer in charge, and if such work had not been carried on before it would probably be three years before the inspections would be made as often as once each six months, due to the large number of existing hazardous conditions needing correction at the start.

It should be borne in mind that it takes some time to organize a fire prevention bureau and train the inspectors, and the initial inspections will disclose so many conditions which require numerous follow-ups in order to secure corrections that the head of the bureau may despair of being able to cover the city once the first year.

### Education and Publicity.

The opportunity for service on the part of a fire department to the community which supports it, along educational lines, is great. Of course, the inspectors, while going their rounds, will spread a great deal of fire prevention information, but generally speaking they will not contact the owner or occupants of dwellings. It is most important that the general public be reached, for by far the greatest number of fires occur in the home, and it is in the home that the majority of deaths from fire take place.

Fire Prevention Week is observed now generally throughout the United States in October of each year, and a successful observance is only obtained as the result of careful planning and thorough coöperation.

The importance of enlisting the aid of civic clubs and associations cannot be over-emphasized. The ideal situation is to have a fire prevention committee as part of every such organization, including Women's Clubs, Parent-Teacher Associations, the Labor Council, Chamber of Commerce, Boy Scouts, Rotary, Lions, Kiwanis, Credit Association, Manufacturers and Merchants associations, and neighborhood improvement clubs. Each of these should be induced to send a delegate to a city-wide Fire Council, the Executive Committee of which could act as an informal "Fire Chiefs Cabinet," and which could serve as an excellent means through which educational matter along fire prevention lines could be disseminated throughout the city.

The Fire Prevention Bureau should have one or more members proficient in the art of public speaking and preparation of articles on the subject for the newspapers. During Fire Prevention Week volunteer speakers from the entire

department should address every school, every club and, where possible, every fraternal society or lodge, as well as delivering talks over radio stations. Appropriate displays should be arranged in store windows, and the numerous activities as recommended by the National Fire Protection Association should be entered into enthusiastically and completely.

This sort of thing, carried on for a week only, concentrates the attention of the public upon the subject of the fire waste, and therefore has a definite value which must not be lost sight of. The National Fire Protection Association can supply a wealth of ideas and materials to be used in the observance, and these should be obtained and plans made well in advance. However, as hereinbefore mentioned, consistent steady work will in the long run produce better results than infrequent "splurges." Both methods should be used where possible. All schools and clubs should be reached by a speaker at least once a year.

The use of the radio for dissemination of fire prevention information is becoming more widespread. In some cities a fire department speaker is on the air every day from ten minutes to half an hour, either at a regular time from the same station or from various stations. A summary of the day's fires is given, and the speaker, after telling of the damage done and injuries or deaths resulting from these fires, selects one or two and tells how they might have been prevented. "Fill in" talks are prepared on special subjects, such as "How to Act in a Theatre When a Fire Alarm Is Sounded," "How to Turn in a Fire Alarm," "How to Clean Clothes at Home Safely," etc.

It is also, in the writer's opinion, perfectly proper to use these speakers to explain to the public how the fire department is operated, the use of special types of apparatus, the need for more apparatus and men, new ordinances along the lines of fire prevention and fire protection, and so forth.

### Laws and Ordinances.

All enterprises, be they social, commercial or governmental, must have rules to guide them. For this reason each State requires the cities and towns within its borders to submit to its legislature the rules under which it desires to operate. This is called its charter, and serves the city just as a constitution serves the nation, a state, or a private corporation. In turn, the ordinances passed by the municipal legislators serve as the by-laws and must conform to the principles laid down by the charter.

It is unfortunate that the functions of a fire department are seldom set forth in city charters. They function in many cases under inferred rather than direct authority, and the inference is generally that the fire department exists for the sole purpose of extinguishing fires. The functions of the modern fire department go far beyond this, and include the prevention of fires through supervision of the installation, operation and maintenance of devices for the

production or use of heat (including electricity); through inspection of buildings to bring to light causes of fire and bring about their removal or safeguarding, as well as the educational work already referred to. They also include "fire spread control" through inspection of plans of new buildings as well as existing structures to see that the provisions of the laws regarding exit facilities, and regarding restriction of the spread of fire by enclosures of boiler rooms, stair, elevator and other shafts, fire division walls, wired glass windows in exposed walls, etc., are being carried out; and "fire protection," by supervising the installation of first aid fire appliances in buildings, such as extinguishers, hose and standpipe systems, automatic sprinkler systems, and fire alarm systems.

It is therefore highly desirable that the city charter be so worded as to authorize the fire department to carry out these functions. Then the City Council can, through ordinance, arrange the details to avoid the overlapping, the gaps, and the conflicts in authority referred to in the opening paragraphs.

Having defined the functions of the fire department and other departments concerned, we come to the fire and building ordinances themselves. I will not attempt to cover the actual provisions which should be included in these laws, as there are a number of cities (Seattle, for example) which have recently enacted and codified their fire and building laws; likewise, model codes can be had for the asking. The point I want to stress is that there must be a *continuous* effort to keep these laws up to date. Right now, for example, has your city any regulatory laws regarding multiple refrigeration systems, or lacquer spraying, or gasoline tank trucks, or X-ray film storage?

Now it just happens that your city is already built and your buildings occupied. It is not only unconstitutional but also in most cases obviously unfair to enforce retroactive laws. A man who puts up a building in conformity with today's rules should not be expected to remodel it next year just because the rules have been changed. On the other hand, we find by experience that things considered safe at one time are definitely determined to be hazardous a few years hence.

This is one of the most vexing problems of a fire department which is conscientious in its attempts to control the losses of life and property from preventable fires. In the first place, who is to say that a certain building or condition is a "hazard" and should be condemned? A frame lodging house, for example, if it is structurally sound, may be hazardous for its occupants because of poor wiring, because of accumulations of rubbish, because of unsafe installations of stoves, flues, etc., because of storage in the basement of paints, gasoline or pyroxylin compounds or because of insufficient egress facilities, any or all of which can be corrected.

Now, still assuming the building to be structually sound, it is possible for it to be unsafe for use as a lodging house or place of assemblage, and yet

perfectly safe for use as a warehouse. As a matter of fact, from the viewpoint of the safety of the occupants of a building with respect to a fire starting within that particular structure, the *material* of which it is built is, to my mind, relatively unimporant as compared with the *arrangement, occupancy* and nature of its contents. Remember that one of the worst fire holocausts in the history of the nation took place in a building constructed of incombustible materials (the Iroquois Theatre, Chicago). On the other hand, from the viewpoint of the spread of fire from one building to another, and the conflagration hazard, the less frame construction the better.

No set of rules can possibly cover all conditions or combinations of conditions which may in fact be deemed hazardous. It follows, then, that some *competent* official or board should be empowered to consider such conditions as they arise and lay down the corrections to be made. In general, it is better to bring about these corrections through persuasion rather than by coercion. This has been done successfully in San Francisco, where, in 1931, the Fire Prevention Bureau secured the correction of some 10,000 hazardous conditions, and in doing so caused the arrest of only *one person.*

Nevertheless, the laws should be kept up to date for use as a *guide* in the work of correcting existing hazardous conditions, and to be enforced for new construction and for changed occupancies of existing buildings. This is partially provided for by requiring Fire Department approval of new and renewal licenses and permits, which in most cities are required for practically every mercantile occupancy.

By having inspectors in the Fire Prevention Bureau who are capable of *selling* fire prevention rather than using the "big stick" of police power, more lasting results are obtained, because a person who is forced to do something will repeat that action usually only when the force is again applied, while if he is "sold" on doing it, he will repeat it voluntarily.

### Records.

In order to determine whether or not a business has made a profit, records of all transactions are kept by bookkeepers and clerks. In order to find out *why* the net profit was so and so, and to produce guides for increasing the net profit, business firms maintain accountants and auditors.

In a fire department how are we to know whether or not the various units are functioning economically, efficiently and effectively unless adequate records are kept and analyzed? If there is an alarming increase in deaths and injuries due to cleaning clothes at home with gasoline and benzine, how is this fact to be noted and brought to the attention of the housewives unless the fire department's system of keeping its records brings it out, or unless some "outsider" happens to notice it and develops the information.

Is the fire department, as an extinguishing unit, getting better or worse, as indicated by the average loss per fire? Are more automobile shops (or clothing stores) having fires this year as compared with last? Is the cost of repairing apparatus mounting, and if so, why? Perhaps it is because we are letting the department "go to seed" through failure to purchase new equipment; or maybe there are more accidents, indicating the need for more careful driving, louder sirens, education of the public to give the fire apparatus the right of way; or, due to greater total mileage on account of more fires or greater response, it is just a natural result of a condition which in turn may be subject to correction.

Are all the men who have been pensioned for disability still disabled? Why is the sick list so long? What was the cost to the department last year in substitutes' pay of the injuries and illness of the members? How much did we pay for acid and soda for chemical engines which might have been saved if we had "pump tanks"? How are our fire losses arrived at? Is it a guess of the chief or other officers, or is an estimate made and then checked later with the owner and the insurance adjuster?

How is the hose holding up? Can its life be increased through better care? How much of the "idle time" of the men in the fire houses is devoted to instruction, schools and drills? Why did Captain Jones inspect only five buildings last month while Captain Smith inspected twenty-five? (Maybe Captain Smith is a "sidewalk" inspector!)

Are all of the supplies being used for the city? Why does Engine 3 get five miles to the gallon of gasoline while Engine 6 gets eight? And so forth and so on. The records of course should be so kept as to make answers to these and similar questions readily available.

But from the standpoint of fire prevention, the causes of fire are most important. Let us assume a common type of fire; that is, the roof burned off of a two-story frame wooden shingle roofed dwelling. After the fire has been extinguished, the battalion chief examines the attic and roof, talks to the occupants, and concludes that the fire was caused by sparks from the chimney alighting on the shingles of the roof, and that it did not originate inside the attic.

He fills in his report card, which has spaces for the names of the owner and occupants, value of the building and contents, amount of insurance thereon, his estimate of the amount of the loss, fire companies responding, streams and appliances used in extinguishing the fire, injuries to members of the department or the public, cause of the fire, how could the fire have been prevented, and recommendations.

Being concerned at the moment only with the last three items, let us see what this chief officer enters. Under "cause of the fire" he states, "Burning

rubbish in open fireplace on hot, windy day, causing heavy draft in flue which deposited burning material on wood shingle roof." Under "how could fire have been prevented" he states, "By refraining from burning rubbish until day when roof would be wet, or disposing of it elsewhere." Under recommendations he would enter (a) That the Fire Prevention Bureau give publicity to the danger of burning rubbish in fireplaces or stoves on dry, windy days, (b) That the burned roof be replaced with an incombustible one.

The report should be routed to the clerk who keeps the records through the Fire Prevention Bureau, and the inspector of the district would have the duty of calling the first recommendation to the attention of the Chief of the Bureau, and the second to the owner of the building, as well as keeping in touch with both the owner and occupant to ascertain the actual loss as soon as it is determined.

The records of the Fire Prevention Bureau should, of course, include a history of each inspection and the conditions disclosed, as well as the disposition of the inspectors' recommendations. A monthly report should show the number of inspections, reinspections, complaints, corrections, publicity, radio talks, special work, etc., and the annual report should list the recommendations of its chief not only as to the operations of the bureau, but also as to needed new laws.

Some departments issue an annual report, which is highly desirable, and which should be carefully studied by all concerned, including the Chief and his principal subordinates, the Commissioner, City Manager, Mayor and members of the City Council, and interested organizations, such as the Board of Fire Underwriters, local Fire Insurance Exchange, Chamber of Commerce, newspapers, etc.

## Conclusion.

Does fire prevention effort pay? A careful study of the fire statistics of a number of cities where efficient fire prevention bureaus have been maintained as part of the fire department has convinced me that the effort pays great dividends. In those cities there are fewer fires, which means less loss for its citizens to absorb; the cost of fire insurance is lower; the total cost of fire department operation is less per capita, and, most important of all, there are fewer fire deaths.

# The Coney Island Conflagration.

Report by New York Board of Fire Underwriters,
(Member N.F.P.A.).

For the third time in twenty-five years Coney Island, on July 13, 1932, was subjected to a fire of conflagration proportions. The two previous conflagrations, one in Steeplechase Park and the other in Dreamland, occurred respectively on July 28, 1907, and May 27, 1911. The first conflagration caused a property loss estimated at $1,500,000 while the second involved a loss estimated at $5,000,000. The present, or third, conflagration has occasioned a loss estimated at between $3,000,000 and $5,000,000, with insurance involved of approximately $2,000,000.

Of the three conflagrations the last one stands out prominently as being the most serious. The others merely destroyed amusement parks, while this fire brought losses and inconvenience to a large number of persons. It was the first fire of any magnitude involving the Boardwalk. It destroyed practically a block of residential structures of good substantial construction,—a block that compared favorably with many within the city and might well have been considered superior to numerous others.

Besides the many made homeless, the large number of persons stranded in only their bathing suits presented a problem never before encountered. Parked automobiles and traffic congestion were also factors in this fire that were not present in the previous ones.

While it is reported by the Fire Department that there was no shortage of water from the domestic or low pressure water system, the high pressure system, upon which so much depends under conflagration conditions, proved inadequate. The existence of a blank brick wall and a shift in the direction of the wind probably prevented a greater portion of Coney Island from being destroyed.

### Construction and Occupancy in the Fire Area.

Of the total area of the blocks involved in the fire, disregarding the Boardwalk and the small block bounded by the Boardwalk, Highland View Avenue, West 22nd and West 23rd Streets, 62.6 per cent was frame, 33.4 per cent was ordinary brick and 4 per cent was fire-resistive construction. Of the buildings actually destroyed or damaged, approximately 45 per cent were ordinary brick and 55 per cent were of frame construction. When considered from a value viewpoint, however, the ordinary brick construction was considerably greater than the frame construction.

Practically all of the brick buildings were of recent construction and in good condition. Outstanding in this group was the row of twelve three-story

Note: See Frontispiece for airplane photograph of this conflagration.

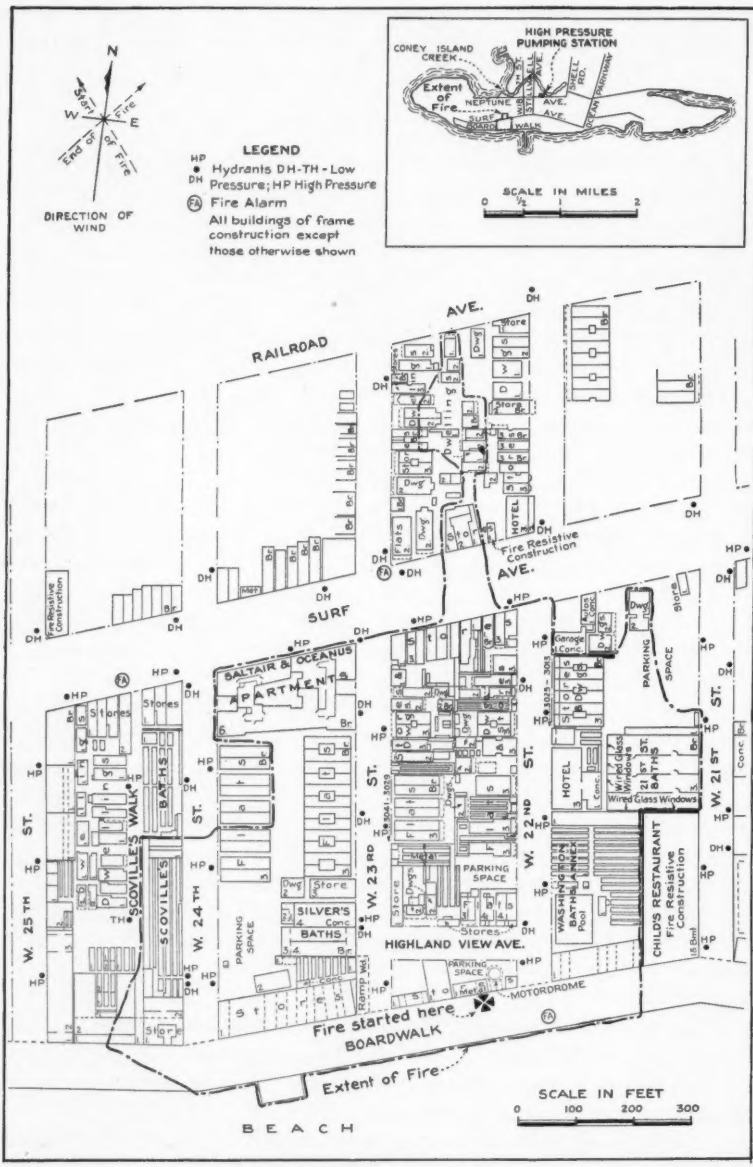



**Diagram of the Burned Area.**

*Acme.*

**The Saltair and Oceanus apartments, showing a high pressure fire stream in operation. These apartments, of substantial appearance but with no effective exposure protection and wooden interior construction, were soon completely involved in the fire and were practically a total loss.**

dwellings on the west side of West 23rd Street and the Oceanus and Saltair apartment houses on Surf Avenue between West 23rd and West 24th Streets. The apartment houses were practically new. They were six-story elevator apartments and housed 200 families.

The frame construction, chiefly in the block bounded by Highland View Avenue, Surf Avenue, West 22nd and West 23rd Streets, consisted principally of one to three-story concessions, stores, dwellings and bungalows. Adjacent to the Boardwalk were a number of one-story frame and corrugated iron bath houses.

In the block where the fire originated (Boardwalk, Highland View Avenue, West 22nd and West 23rd Streets) all the concessions, except the Motordrome, were erected upon concrete piles so that the floors were on a level with the Boardwalk. The Motordrome, originally constructed several years ago but rebuilt this year, was of frame construction and extended from above the Boardwalk down to the ground level. It is quite possible that the wood forming the bowl of the Motordrome was oil-soaked. Of the other concessions in this block one was of hollow tile on steel frame, and the remainder were of corrugated iron on angle iron frame with wood floors.

The Boardwalk was of wood planking and stringers on concrete piles and girders. There were several open automobile parking spaces in the fire area.

The greater portion of the buildings involved in the fire were occupied for dwelling purposes. Two large brick buildings were occupied as bath houses, and various amusement and small mercantile concessions occupied the area adjacent to the Boardwalk. The occupancy of the block in which the

*International.*

**Panoramic view of part of the ruins of the Coney Island conflagration of July 13, 1932. The fire started under the Boardwalk at the left of this picture and was swept northward (to the right) by the wind from the ocean. The ruins of the Saltair and Oceanus apartment houses are in the background at the right. As may be seen from the picture, brick joisted buildings made up a good part of the fire area; the balance was largely frame and metal. This picture was taken from the roof of the Child's restaurant building, a fire-resistive structure that stopped the spread of the fire to the east.**

**Parked automobiles interfered with fire department operations to a marked degree and delayed access to the burning area at the start of the fire, when every minute counted. These two pictures show the wreckage of a few of the large number of automobiles that were parked in the fire area.**

fire started consisted of the Motordrome and numerous small concessions. The contents of these concessions were not exceptionally combustible. The operator of the Motordrome testified that but three gallons of gasoline were kept on hand, all in the tanks of the motorcycles. Directly at the rear of these concessions was an open parking lot in which there was one automobile.

The west sides of West 22nd and West 23rd Streets were all occupied by automobiles parked fender to fender, and most of the private parking spaces were full. There were no automobiles parked on Highland View Avenue.

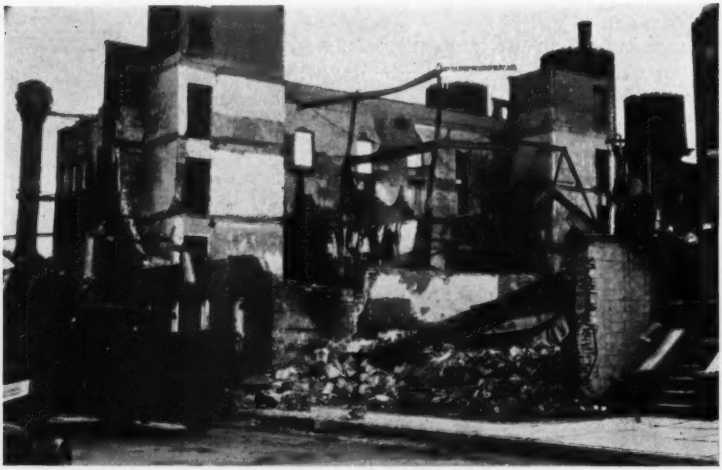
### Origin of the Fire.

It has been definitely determined by the Fire Marshal's investigation that the fire had its inception under the Boardwalk approximately 12 feet west of the Motordrome (see diagram) and was caused by boys burning rubbish for a bonfire.* Accumulations of waste paper and other rubbish

*The custom of building bonfires under the Boardwalk is said to be not at all uncommon to Coney Island, hence when observers first saw this one they thought nothing of it. Several witnesses reported that the bonfire had been in progress for some time before anybody paid any serious attention to it and that when passers-by began to grow concerned more time was spent in throwing sand upon it. When it ultimately became clear that the fire was getting away then somebody thought to pull a street box.

Other witnesses testified that the alarm was sounded without undue delay. When the Battalion Chief arrived just ahead of the first fire companies a heavy pall of black smoke was blowing across Surf Avenue. At that time a section of the Boardwalk approximately 15 x 50 ft. was involved. Under the adjoining buildings, as well as under the Boardwalk, was an open space of eight to ten feet.—Ed.

Two views of the ruins of Silver's Baths, West 23rd Street. Upper picture is taken from the ruins of the Boardwalk, looking northeast across the wreckage of the frame stores fronting on the Boardwalk. The lower picture is taken from West 23rd Street, looking the opposite direction from the upper picture.



blown in from the beach provided ready fuel for a fire and helped to spread the flames once they had gained headway. The Boardwalk at this point was about ten feet above the ground level.

### Story of the Fire.

The first alarm was received by the Fire Department at 3:27 P.M. from a fire alarm box on the Boardwalk at the foot of West 22nd Street. To this alarm responded a Battalion Chief with three engine and two ladder companies. Two high pressure hydrants were available immediately adjacent to the block involved in the fire, and two high pressure and two low pressure hydrants were within a short distance. Three deck pipes and three hand lines were put into service on the fire immediately and other hand lines were stretched to protect exposures. The crews of the ladder companies manned hose lines, as did the members of the fire patrol (salvage corps) when they arrived. It is said that a hand line was stretched under the buildings to the Boardwalk, but the heat was so intense as to make its use impossible.

At 3:36 P.M., or nine minutes after the first alarm, a second alarm was sounded, bringing three additional engine companies and one ladder company. A third alarm was transmitted at 3:44 P.M., eight minutes after the second, and brought three more engine and one truck companies. A fourth alarm was sounded at 3:53 P.M., a fifth alarm at 3:57 P.M., and a Borough call for Brooklyn and Queens at 4:44 P.M. At 4:45 P.M. companies were summoned from Manhattan and again at 5:05 P.M. Special calls were also made for a fireboat, a searchlight truck and additional firemen. The last call was made at 10:36 P.M., or seven hours after the first alarm. In all, thirty-one engine and twelve ladder companies responded, together with a rescue company, two fireboats, a searchlight company and a unit of the salvage corps. Several hundred firemen were thus engaged in the fire fighting operations.*

From its point of origin beneath the Boardwalk the fire spread to the near-by concessions and to the Motordrome. It then spread westward along the Boardwalk to a wooden ramp which led up from the west side of West 23rd Street. From this point it spread to Silver's Baths (see diagram) and the row of dwellings on the west side of West 23rd Street, and then to a group of dwellings on the east side of the same street and to the Saltair and Oceanus apartments on Surf Avenue.

A southwest wind was blowing at the start of the fire, which spread the fire westward. Later the wind shifted to the southwest and spread the fire

*The report of the Battalion Chief in charge reveals an interesting circumstance in connection with the early stages of the fire. He apparently realized that he had a fire of considerable magnitude on his hands and immediately on his arrival dispatched his driver to the fire alarm box on the Boardwalk to send in a second alarm. The driver met with some delay here, for all the boxes on the Boardwalk in that section are on the same circuit and he could not tap in his signals because other boxes were being operated by citizens, thus cutting out his signals. When he realized what he was up against he telephoned in the second alarm.—Ed.

**Ruins of 21st Street Baths, looking east. The blank fire-resistive wall of Child's restaurant, which stopped further spread of fire in this direction, may be seen in the extreme right background.**

eastward across 22nd Street. The records of the U. S. Weather Bureau applicable to Coney Island indicate wind velocities of from 8 to 16 miles per hour, which is borne out by witnesses several blocks from the fire who stated that in their locality the wind was negligible. However, in common with fires of this character, after the fire reached conflagration proportions it created its own draft or wind, which was sufficient to carry sparks and flaming brands several blocks, and accounts for press reports and airplane photographs indicating a high wind of almost gale proportions.

Within a short time the entire fire area south of Surf Avenue (as indicated by the diagram) was involved, and sparks and brands had ignited buildings in the center of the block north of Surf Avenue between 22nd and 23rd Streets. The rapid spread of the fire and the dense smoke forced the Fire Department to abandon its original positions and retreat to new locations at, or near, Surf Avenue. The efforts of the firemen were then concentrated upon holding the fire at this point and preventing it from spreading further east and west.*

On the west side the Fire Department was aided by the shift in the wind to the west, as well as by an open parking space and the Saltair apartment house. The latter, while badly gutted, formed a barrier to the further spread

*A significant factor in the rapid spread of the fire was the character of the construction in the block on the north side of Highland View Avenue, immediately behind the point of origin of the fire and in the direct path of the wind. This block consisted of 80% frame structures and 20% brick. Of the eight entirely brick buildings in the block five were in a row laterally with the course of the fire. The frame construction in this block was for the most part old, flimsy and dry as tinder. The buildings nearest Highland View Avenue were in flames within ten minutes, notwithstanding the fact that men with hose streams had been stationed on the roofs to combat flying brands.—Ed.

**Typical views of the ruins of brick joisted dwellings. The upper picture shows the buildings numbered 3013 to 3025 West 22nd Street, and the lower picture 3029-3041 West 23rd Street.**

of the fire. On the east, the blank brick wall with a ten-foot coped tile parapet of Child's restaurant at the foot of West 21st Street (see photograph on page 136) prevented the fire from extending further in this direction. The 21st Street Baths, of brick construction, a large open parking space and a row of brick dwellings also were factors in preventing further spread of fire in this direction. The Fire Department was unable to attack the fire from the south side due to the absence of hydrants on the ocean side of the Boardwalk.

**Débris of part of Scoville's Baths at West 24th Street and the Boardwalk, where the fire was prevented from further spread to the west by the efforts of the fire department and a change in the wind.**

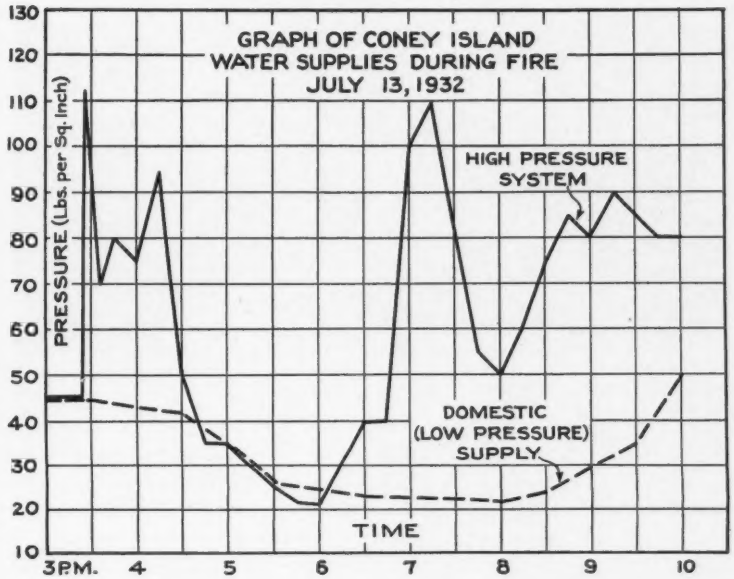
Examination of the ruins indicates that the majority of the buildings were ignited by sparks and burning brands falling upon the roofs and burning downward. This was particularly evident in the group of dwellings at 3013-3025 West 22nd Street. The rear walls of these buildings were not touched by fire and the photograph of these damaged structures shows an undamaged cloth "To Let" sign still in place on the front of these buildings.

Sparks falling upon bedding laid on window sills aided the spread of the fire to the interior of buildings. The Saltair and Oceanus apartment houses on Surf Avenue were ignited by sparks entering open windows on the south wall as well as by flaming brands falling upon the roofs.

### Water Supply.

The proposed new high pressure pumping station has not as yet materialized, and it is estimated that a year's time and an additional appropriation of $150,000 will be necessary for its completion.

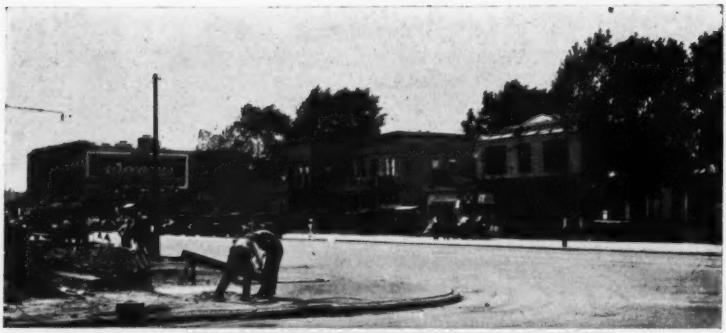
The present high pressure pumping station is located just south of Coney Island Creek, between Stillwell Avenue and West 12th Street, remote from the congested district. This station has three vertical triplex double acting pumps taking suction through a 12-inch connection to a fresh water street main and through a 20-inch salt water main from Coney Island Creek. The pumps were designed to deliver 1500 gallons per minute against a head of 150 pounds, but due to depreciation the actual capacity of the pumps at the time of the fire was somewhat less. The pumps are driven by individual gas engines run on illuminating gas supplied by a private gas company located across Coney Island Creek and the engines are started by compressed air maintained in tanks at 150 lbs. pressure. It is estimated that this present station can supply but nine full sized hose streams.




The pumps at the high pressure pumping station were started on receipt of the first alarm and during the first hour of the fire maintained an average of about 80 lbs. on the system as indicated by the accompanying chart. As the fire assumed conflagration proportions, the system was overtaxed (either through the use of hose streams in excess of the number that could be supplied or due to the fact that hose lines were burned off and hydrants left open as firemen retreated before the flames) and by 6:00 P.M. the pressure had dropped to 22 lbs. At about this time this condition was remedied by the use of two fireboats which pumped from Coney Island Creek into high pressure hydrants,* and the use of some eighteen fire department pumpers which pumped water from the low pressure system into the high pressure system through street hydrants.

The pressure on the domestic or low pressure system at the time of the fire was normally about 45 lbs. and this pressure was maintained during the first hour of the fire. From about 5:30 to 8:30 P.M. the pressure in the system averaged 33 lbs. Because of repairs being made to a bridge leading to Coney Island, a 20-inch domestic main was out of service. It is estimated that this main would have increased the domestic supply in Coney Island by 25 per cent. This main will not be back in service again for several months.

*The fireboat *Harvey* is reported to have pumped 1,248,400 gallons and the *William J. Gaynor* 700,000 gallons. One fireboat relieved the other; the two did not pump simultaneously.—Ed.



**Looking northwest across Surf Avenue, from the corner of West 22nd Street. The fire was carried across this street (120 ft. wide) by flying brands which ignited frame buildings in the center of the block at the right.**

### Property Damage.

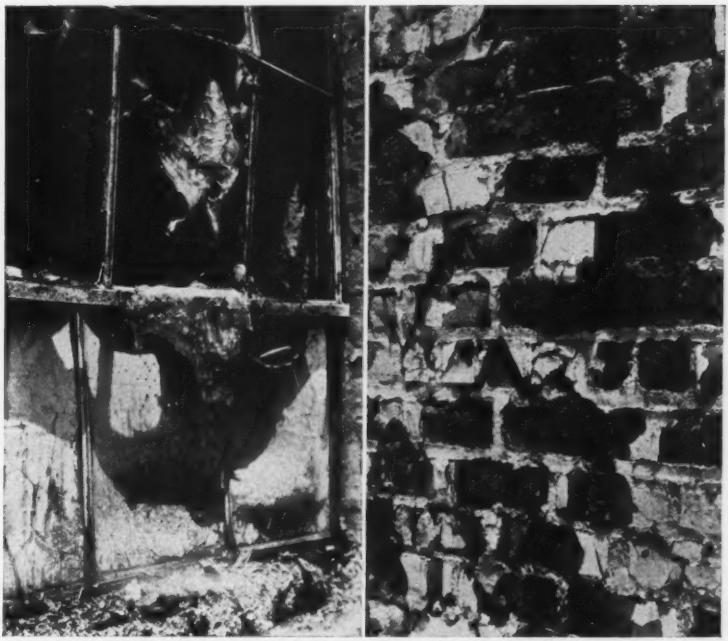
The damage to the structures within the fire area south of Surf Avenue, as indicated by the diagram, was severe. Many automobiles (estimated at from 60 to 100) within the area were totally destroyed including the Battalion Chief's car. One hose wagon was also damaged. The clothing and valuables of countless bathers stored in lockers and bath houses were totally destroyed. To the east of the fire Child's restaurant was without material damage, while the top floor and rear of the adjoining 21st Street Baths were severely damaged, although other portions of the building were saved. North of Surf Avenue the damage was confined to the roofs and rear walls of the buildings involved and the total destruction of sundry small frame structures in the rear yards.

The loss has not yet been adjusted, but it is estimated to be between $3,000,000 and $5,000,000. The amount of insurance involved is estimated at $2,000,000.

### Conclusions.

It has been repeatedly pointed out by those interested that the major portion of Coney Island, lying between Ocean Parkway and 37th Street possesses a conflagration hazard of a pronounced degree because of the vulnerable construction of the major portion of the buildings within that area. Nevertheless, the destruction of the buildings in the block bounded by the Boardwalk, Surf Avenue, West 23rd and West 24th Streets may be viewed with considerable apprehension, for the construction in this block was considerably better than in any other block south of Surf Avenue with one exception.

The total destruction of a considerable quantity of frame buildings permanently eradicates that quantity of such construction from Coney Island, as the Building Code will not permit buildings of such type to be erected in the future.



**Left: Melted wired glass in south wall of 21st Street Baths, near west wall of Child's restaurant.**

**Right: Close-up view of wall of Child's restaurant, showing spalling of brickwork. These pictures indicate the temperatures reached during the fire.**

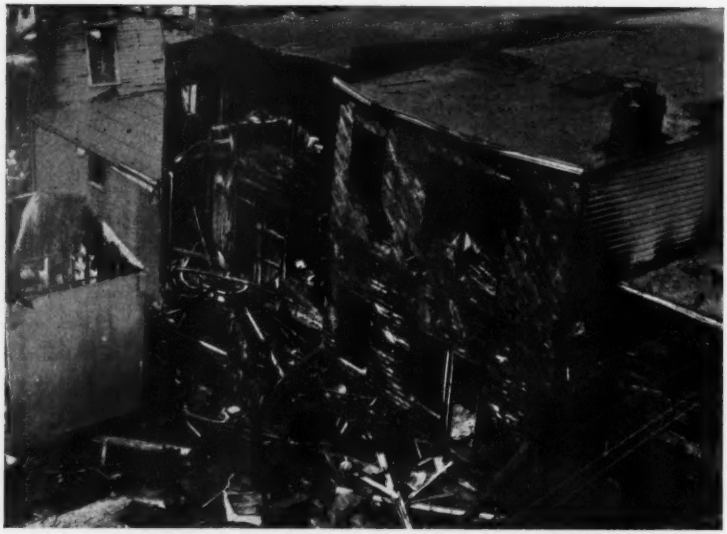
The prominent barrier in the path of the fire was Child's restaurant, a building of fire-resistive construction with blank brick walls on the west and north. These walls withstood a severe exposure, as is evidenced by the spalling of the brickwork, and prevented the fire's travel to the east.

Although the fire could not have reasonably been expected to assume the proportions that it did at the start, because of easy access and the limited amount of combustible material included in the construction and contents of the buildings first involved, the work of the fire department in preventing its spread after assuming conflagration proportions is commendable.

If the conflagration hazard of Coney Island is to be lessened, the following recommendations should be carried out:

1. Transverse fire stops should be provided underneath the Boardwalk at least at all street intersections. Such fire stops should be so arranged that the street ramps will be segregated from the Boardwalk, or the ramps should be constructed entirely of incombustible material.

2. Hydrant outlets should be extended to the south side of the Boardwalk or some other arrangement provided so that a water supply will be avail-



**Combustible construction in the center of the block bounded by West 22nd and West 23rd Streets, and Surf and Railroad Avenues, ignited by brands carried by the wind several hundred feet from the main fire area.**

able to the fire department from the ocean side of the Boardwalk.

3. The problem of automobile and pedestrian traffic should be carefully studied with a view to eliminating interference with the fire department.

4. The regulations with respect to bonfires on the beach or under the Boardwalk and the disposal of rubbish should be strictly enforced.

5. The space underneath all buildings should be enclosed by masonry construction so as to prevent the accumulation of combustible rubbish and preclude the spread of fire beneath these buildings.

6. Construction of the proposed new high pressure pumping station to replace the present station should be completed without delay.

In conclusion, there should be no misconception on anyone's part that the adoption of these recommendations would entirely eliminate the conflagration hazard of Coney Island. The adoption of the recommendations would go a long way in preventing a conflagration, but until practically the entire area from Ocean Parkway to 37th Street is rebuilt along proper fire resistant lines there will always remain the possibility of a fire of conflagration proportions.

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Note: Press reports since the fire indicate that the parking of automobiles has been banned in the streets in the area from 15th Street westward to Sea Gate and from Surf Avenue to the Boardwalk. This is, of course, helpful to this area, but districts where parking would be permitted are just as combustible in construction and subject to the same possibility of conflagration as the proposed restricted area.

# Tests on Nitrocellulose Film Cabinets.

By A. J. Steiner (Member N.F.P.A.),
Underwriters' Laboratories.

The N.F.P.A. Committee on Hazardous Chemicals and Explosives, after due study of film hazards, recommends the use of slow-burning or safety base (cellulose acetate) film wherever possible. Recognizing, however, that nitrocellulose film is not as yet a thing of the past, and with full knowledge that its hazards cannot be wholly suppressed, the committee has prepared the Regulations for the Storage and Handling of Photographic and X-ray Nitrocellulose Films. (Published by the National Board of Fire Underwriters, 1930.)

The hazards of use and storage of photographic and X-ray films of the nitrocellulose type have been demonstrated on various occasions in the field with notable loss of life as well as property damage and are conspicuous among the hazards which compel the attention of those whose activities are directed toward reduction of losses by fire and accident. These hazards can be reduced to a considerable degree by design and use of suitable equipment for storage of such moderate quantities of films as must be kept accessible for frequent reference.

Field regulations in various localities permit storage of limited quantities of films in approved cabinets. What are approved cabinets, or what cabinets should be recognized as approved? The question must be approached with ample knowledge of the properties of nitrocellulose films and their action in decomposing, igniting, and burning; and by means of suitable and adequate fire tests, conducted in such manner and in such environment that their conduct will not jeopardize either those engaged in the experimental work or persons and property in the vicinity.

Judging from available experimental data and field experience, approved cabinets should have self-closing doors and be equipped with vents of sufficient size to release readily the gases generated by burning films within the cabinets. Tests have indicated that vents should provide unobstructed cross-sectional areas in the proportion of not less than 14 sq. in. for each 100 lbs. of film content. The cabinets should be constructed to provide for installation in such manner that if their contents ignite the resulting fumes will be discharged outdoors; and so that there will not be harmful leakage of these fumes into rooms in which the cabinets are installed; and so that the cabinets during burning of their contents will not emit sufficient heat to cause decomposition or ignition of films or other combustibles which may be near by or in contact with the exterior surfaces of the cabinets. Multi-compartment

cabinets should be so constructed that complete burn-out of films in one compartment will not cause ignition or decomposition of films in any other compartment.

External examination of finished cabinets will disclose whether or not they possess certain of the characteristics set forth above as requisite. But their heat-insulating properties, and their ability to prevent harmful leakage of fumes through doors or fittings, and their performance in other significant respects when subjected to external fire or in the event that their film contents become ignited, are matters of critical import which can be determined only by fire tests. Tests as described below have been conducted by Underwriters' Laboratories at the Lemont Explosion Testing Station and have led to listing and labeling of cabinets of suitable design which have performed creditably in the tests.

### Plan of Test.

Tests and investigations are planned to determine the control of hazard afforded by the device when films in the cabinets are ignited; the possibility of the resulting fumes being discharged outdoors; fire communicating from one cabinet to adjacent cabinets or emitting sufficient heat to cause decomposition of films or other combustibles in contact with the exterior surface of the cabinet; the leakage of fumes into the surrounding room; the protection afforded from external fire; and the danger of explosion when film is ignited in several compartments at approximately the same time.

### Test No. 1.

This test is conducted to determine the performance of a cabinet when the stored film is ignited and the cabinet is provided with a vent on the basis of 14 sq. in. per 100 lbs. of film.

Test Method. The sample consists of one cabinet placed in a practically gas-tight test chamber of about 1200 cubic ft. volume. For test purposes the cabinet is provided with the minimum size vent recommended by the N.F.P.A. Committee. All joints are securely sealed against leakage of gases. One hundred pounds of 14 by 17-in. nitrocellulose X-ray film (filed 12 films to each manila envelope) are placed in the cabinet, the open ends of the envelopes all facing one side.

Through one side of the cabinet an ignition coil is inserted, and through the other side a thermocouple and a pipe for the determination of pressure. Thermocouples for the determination of temperatures on the exterior surfaces of the cabinet are provided.

Four gas-sampling lines extend from the exterior of the test chamber to the various points around the cabinet. Duplicate gas samples are taken for determination of nitrogen dioxide and one for an Orsat analysis.

A cage, containing four live and healthy guinea pigs, is placed near the front of the cabinet.

Throughout the test observations are made covering the temperatures attained on the interior and exterior of the cabinet, the quantity and color of the gases being released from the top of the vent pipe, and the accumulation of fumes in the test chamber.

Observations are made during and after the test regarding the condition of the guinea pigs, and information is obtained relative to the durability of the cabinet and the effect of the fire on the strength of the parts and on the assembled cabinet.

OBSERVATIONS DURING AND AFTER THE TEST. The following is a summarization of satisfactory results recorded in a test conducted at the Underwriters' Laboratories, relating to each feature mentioned above. The appearance of a test sample before the test is shown in Fig. 1.

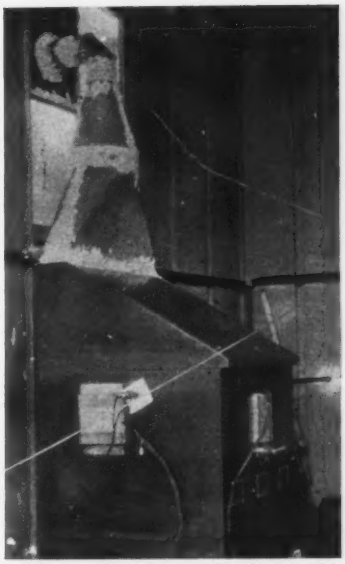


**Fig. 1. Appearance of a single cabinet before test.**

A few seconds after the current was thrown on the electric ignition coil, white fumes were issuing from the top of the vent pipe, gradually increasing in volume; the maximum quantity is shown in Fig. 2. At approximately 5 minutes the fumes were decreasing and gradually changing to a dark brown color. At 10 minutes practically no fumes were issuing from the vent, the doors of the test chamber were opened and the guinea pig cage removed. When the doors were opened a small quantity of brown fumes was released.

The blood from one of the guinea pigs was tested for evidence of carbon monoxide and the amount found was judged to have no significance. The remainder of the pigs were observed for a number of days, at the end of which time observations were discontinued, as no ill effects of the exposure were noted.

The duplicate gas samples taken from the vicinity of the cabinet were analyzed for their toxicity, which was found to be of a negligible quantity.

Negligible indication of gas pressure on the interior of the cabinet signified that the vent area provided was satisfactory.

The finish on the exterior surfaces of the cabinets did not show any indication of having been exposed to intense heat and the maximum temperatures recorded were not sufficient to cause ignition of film or other combustibles in contact with the cabinet.

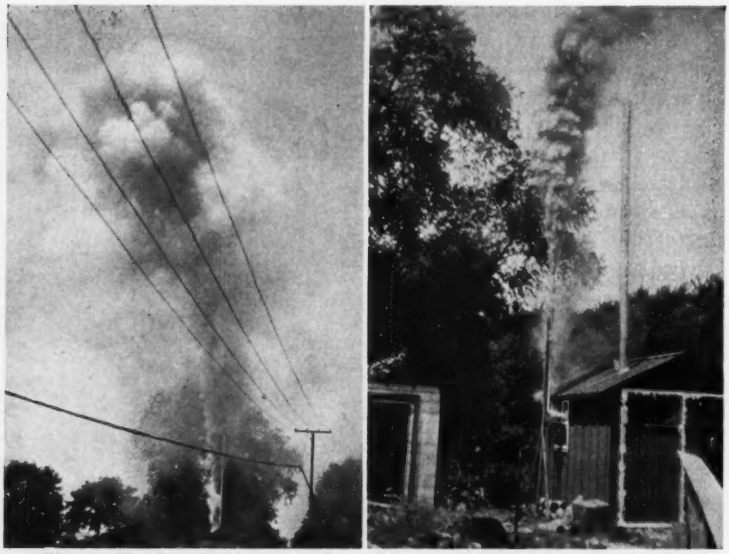


**Fig. 2. Showing fumes released, between 3 minutes and 4 minutes 30 seconds after ignition, from a vent pipe of a cabinet containing 100 lbs. of film. (The large pipe was not used in this test.)**

**Test No. 2.**

This test is conducted on a multiple-compartment cabinet to determine whether the fire from burning film in one cabinet will communicate to adjacent cabinets through the vent pipes common to all.

TEST METHOD. The sample consists of three cabinets superimposed as shown in Fig. 3, placed in the test chamber previously described. The cabinets are provided with the minimum size vent pipe required.

One hundred pounds of 14 by 17-in. nitrocellulose X-ray film (filed 12 films to each manila envelope) are placed in each of the three cabinets, the open ends of the envelopes all facing one side.

Preparation for test and observation during and after test are similar to that described in Test No. 1, except that the outlet of the vent pipe is provided with an arrangement as shown in Fig. 3, whereby the toxicity of the fumes released would be reduced at their point of escape, as a precaution against damage in the neighborhood.

Observations are made as to the effectiveness of the design of the cabinets and vents, when connected to a common flue, to prevent the communication of fire from one cabinet to those above and below.

OBSERVATIONS DURING AND AFTER TEST. The following is a summarization of satisfactory results, recorded in a test conducted at the Underwriters'

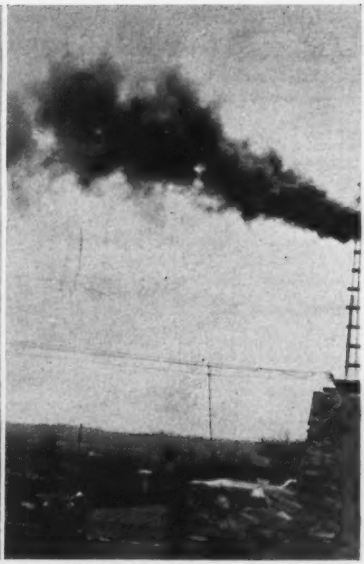


**Fig. 3 (left). Appearance of test sample and chamber before test. Note the cage containing guinea pigs hanging in front of cabinet assembly. The hood on top of vent pipe and pipe above vent were installed for the purpose of neutralizing the toxicity of the fumes discharged during the test.**

**Fig. 4 (right). Showing release of fumes 2 minutes 30 seconds after ignition of film. Neutralizing spray washing fumes as they are released from vent.**

Laboratories, relating to each feature mentioned above. The appearance of the test sample before test is shown in Fig. 3, and quantity of fumes released in Fig. 4.

A few seconds after the current was thrown on the electric ignition coil, fumes issued from the vent pipe and gradually increased and decreased in volume as in Test No. 1.

The guinea pig cage was removed immediately after the doors of the test chamber were opened at approximately 10 minutes after the start of the test, and examined for injury from exposure during the test; the duplicate samples taken were analyzed. The results recorded were similar to those recorded in Test No. 1.

Indication of gas seepage through any of the parts of the cabinet assembly was not noted during the examination after test. The maximum temperature recorded on the exterior surface was not sufficient to cause ignition of film or other combustibles in contact.

The films in the top and bottom cabinets were intact and practically unaffected by the burning of the film in the center cabinet, indicating that

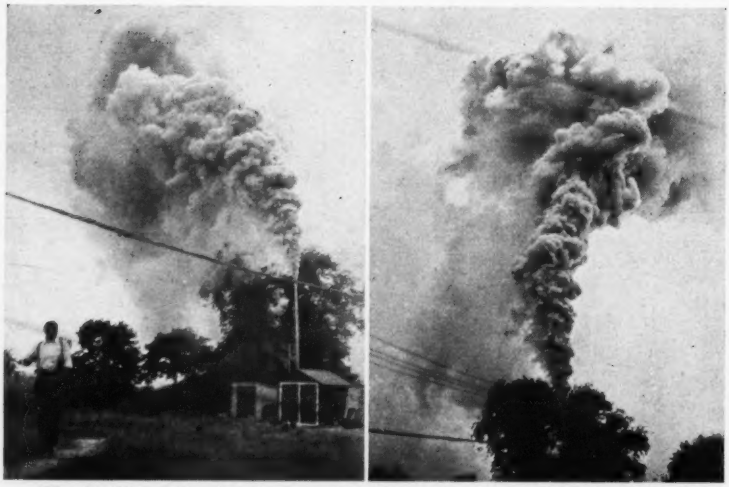


**Fig. 5. Views showing fumes released 1 to 4 minutes after ignition of 300 lbs. of nitrocellulose film.**

the intercommunication of flame or heat from one cabinet to adjacent cabinets was properly safeguarded.

**Test No. 3.**

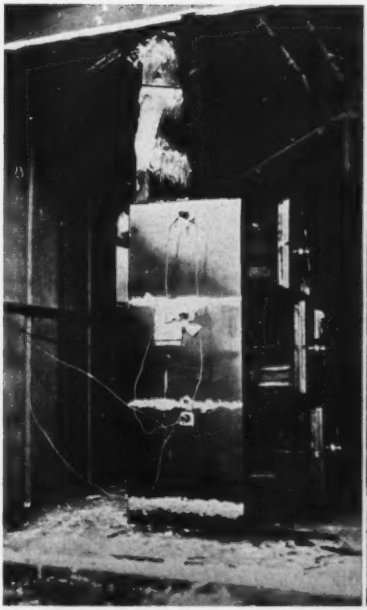
This test is conducted to determine whether a common vent of an area based on 14 sq. in. per 100 lbs. of film stored is adequate venting when films in an assembly of several cabinets are burning simultaneously and whether the quantity of fumes seeping into the test chamber from more than one cabinet is dangerous.

TEST METHOD. The sample consists of three cabinets superimposed, placed in the test chamber in a similar manner as described in Test No. 2.

One hundred pounds of 14 by 17-in. nitrocellulose X-ray film (filed 12 films to each manila envelope) are placed in each cabinet with the open end of the envelope facing one side. An ignition coil and a thermocouple are inserted through the sides of each cabinet. Preparation for test and observations during and after test are similar to that described in Test No. 1.

OBSERVATIONS DURING AND AFTER TEST. The following is a summarization of satisfactory results, recorded in a test conducted at the Underwriters' Laboratories, relating to each feature mentioned above.

A few seconds after the ignition switch was closed, a small quantity of fumes was issuing from the vent pipe. The fumes increased in quantity very rapidly and appeared to be practically constant from 1 to 4 minutes after ignition, as shown in Fig. 5, after which time the fumes gradually decreased; at 7 minutes only a small quantity of fumes was issuing from the vent pipe. Throughout the test the atmosphere in the test chamber was clear.



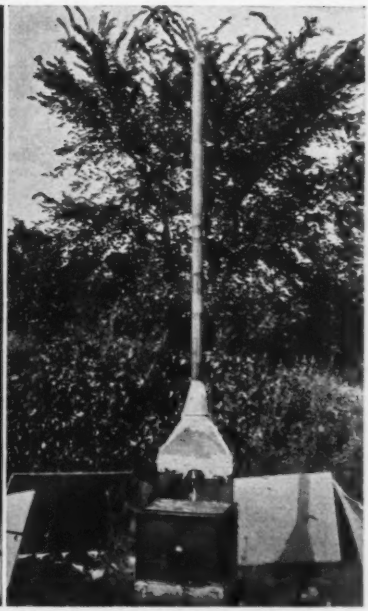


**Fig. 6 (left). Appearance of cabinets after film fire in all three cabinets.**
**Fig. 7 (right). Appearance of cabinet during external fire test.**

When the doors of the test chamber were opened 10 minutes after the start of the test, the guinea pig cage was removed and the release of a small quantity of brown fumes was noted. The examination of the guinea pigs did not reveal any injury from the exposure during test.

Appearance of the cabinets after test is shown in Fig. 6. No indication of any local concentrated passage of fumes from the interior through the joints of the parts was noted. The finish on the exterior surfaces of the cabinets did not show any effect of having been exposed to intense heat.

**Test No. 4.**

This test is conducted to determine the protection afforded to films in the cabinet when exposed to an external fire.

TEST METHOD. The sample consists of one cabinet equipped with a vent pipe of the size used in Test No. 1. The assembly is mounted in a 48 by 48-in. pan containing alcohol which is used as fuel.

One hundred pounds of 14 by 17-in. nitrocellulose X-ray film (filed 12 films to each manila envelope) are placed in the cabinet.

The door of the cabinet is closed and the alcohol is ignited. Fuel is added as the test progresses until 15 gallons of alcohol are consumed.

OBSERVATIONS DURING AND AFTER TEST. The following is a summarization of satisfactory results, recorded in a test conducted at the Underwriters' Laboratories, relating to each of the features mentioned above.

The cabinet was exposed, as shown in Fig. 7, to flames bathing the exterior surfaces for a period of 15 minutes. During the first 5 minutes of the test the metal on the exposed surfaces bulged and warped, and the joints between the door and cabinet appeared to open. As the test progressed, the joints appeared to close and the surfaces assumed a uniform bulge.

When the cabinet was cool, the drawer was opened, and the film was found intact and practically unaffected by the fire exposure.

**Control of Hazard.**

The tests indicate that the hazard of burning film in cabinets of suitable design and construction is to some extent controlled by discharging fumes to the outside, confining the fire from communicating from one cabinet to adjacent cabinets or transmitting sufficient heat to cause decomposition of film or other combustibles in contact with the exterior surfaces of the cabinet, reducing the leakage of fumes into the surrounding room, affording protection from small external fire and the danger of explosion due to films burning in several cabinets at approximately the same time.

The above is on the assumption that the cabinets are closed in all cases, properly installed, maintained, and provided with a well-constructed tight flue, as described in the 1930 Regulations of the National Board of Fire Underwriters for the Storage and Handling of Photographic and X-ray Nitrocellulose Films, as recommended by the N.F.P.A. Committee, and a minimum of 14 sq. in. area for each 100 lbs. of film stored.

The photographs in the foregoing article illustrate the great volume of hazardous fumes which are generated by burning 100 and 300 lbs. of nitrocellulose films, a quantity commonly kept accessible for daily or frequent reference in hospitals or offices.

Photograph, Fig. No. 1, shows a moderate size cabinet which has a capacity of 100 lbs. of films and when burning will generate fumes in the quantity shown in photograph, Fig. No. 2. A well-designed vented cabinet properly installed will prevent direct discharge of the fumes into the room in which the films are stored. But the hazard of the film clouds shown in the accompanying illustrations must be clearly recognized. They may be expected to work injury unless the discharge ends of the vent pipes can be so located that the escaping fumes will not be carried into neighboring buildings or locations where they cause harm, or back into the buildings in which they originate.

# Bremo Bluff Power Plant Fire.

**Report by South-Eastern Underwriters Association,**
**(Member N.F.P.A.).**

A fire in the modern steam-electric plant of the Virginia Public Service Co. at Bremo Bluff, Virginia, on June 28, 1932, caused a loss estimated at $400,000, and again showed that a heavy fire loss may occur in a modern electric plant where neither building nor equipment is in any way combustible, and the only potential fuel is lubricating oil.

The building, erected in 1931, is of brick and steel construction, with reinforced concrete floors and a gypsum block roof on an unprotected steel frame. The north wall is metal, future extension being planned in this direction. The equipment consists of two 18,750 KVA, 13,750-volt turbo generators, high pressure boilers and the auxiliary equipment usual in a plant of this type. The arrangement is shown by the accompanying diagram.

### The Story of the Fire.

The plant was operating under normal conditions with only unit No. 2, located in the northeast corner of generator room, being in operation with boiler unit No. 1 furnishing steam at the time. During the afternoon the operators noted a leak in a half-inch pipe leading to an oil gauge. This leak occurred in a pipe nipple between a globe valve and an elbow at the point where the pipe entered the elbow. The oil at this point in the system was under from 8 to 12 lbs. pressure, and it is understood that there was practically no danger of an excess pressure being built up on this line.

Immediately upon discovery of the leak two men began catching the dripping oil in buckets. The cover was removed from the oil reservoir and

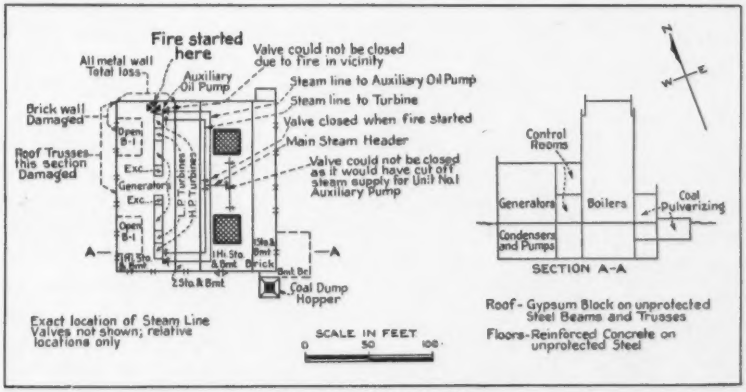


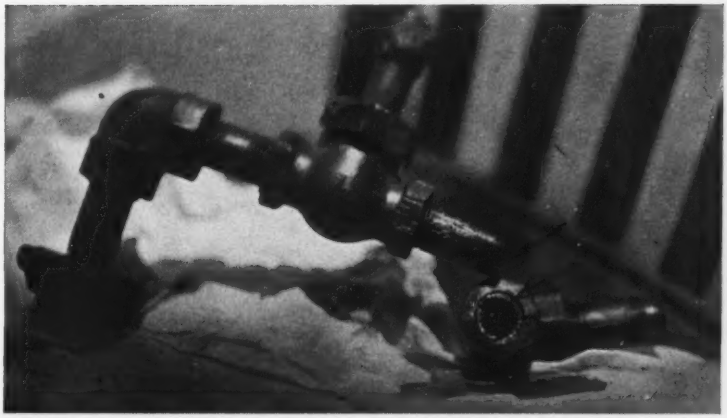

**Diagram of the plant.**

**The Bremo Bluff power plant which sustained damage estimated at $400,000 when leaking lubricating oil was ignited by a high pressure steam pipe.**

the oil poured back into the reservoir. How long the oil had been leaking is unknown, but it is thought that it was only for a very short while, as operators noted only a small pool of oil on top of the reservoir. Operators stated that the oil was flowing freely from the break. There was no way of cutting the oil gauge line off, as the leak occurred on the supply side and immediately ahead of the controlling valve in this line.

Steps were taken at once to switch the load from unit No. 2 to unit No. 1 so that the defective oil line might be repaired. Unit No. 1 was brought up to speed in about 55 minutes and operators were ready to synchronize the unit with the line. At 6:35 P.M., and before the load had been shifted from unit No. 2 to unit No. 1, the oil line broke completely at the point of the leak. The broken line slipped over several inches, allowing the oil to be forced unobstructed from the broken pipe under about 10 lbs. pressure on to an uninsulated part of the high pressure steam line to the turbine. The oil immediately ignited from the hot metal. The alarm was given at once and all equipment was disconnected.

The generator, according to statement of operators, after being disconnected, was brought to a stop within about 25 minutes, using the direct current exciter as a braking machine. As the generator slowed down an automatic valve started the auxiliary oil pump on the lubricating system, and this pump continued to maintain pressure over the entire lubricating system, forcing oil from the broken pipe even after unit No. 2 had been brought to a stop. Oil leaked down through the metal flooring to equipment below and burned with great intensity. The fire in this section prevented men from getting to valves controlling the auxiliary oil pump. Also the main controlling valve on steam line from boilers could not be closed until unit No. 1 had stopped rotating, as this would have cut off steam supply from auxiliary oil pump for this unit, thereby causing damage to be done to bearings on this



**The broken nozzle in the oil gauge line that was responsible for the oil leak.**

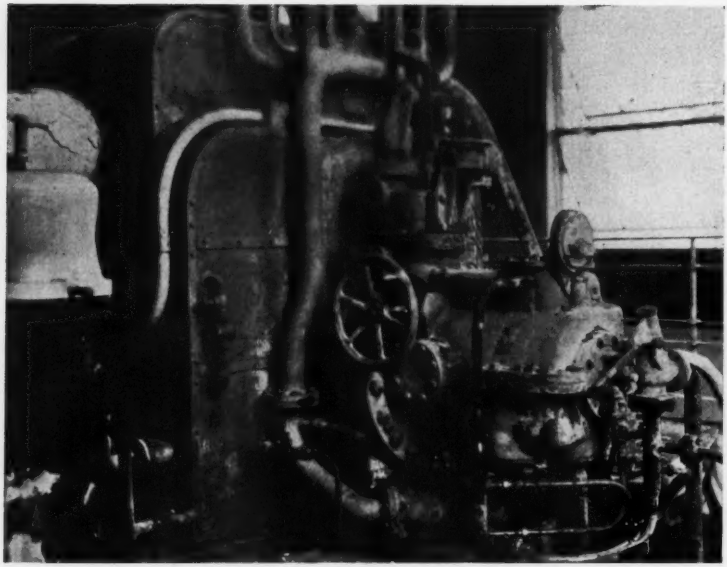
unit. Due to this condition the auxiliary pump for unit No. 2 continued to operate for approximately 40 minutes after the fire broke out. The oil reservoir was completely surrounded by flames and the heat caused combustible vapors or gases to be given off, which became ignited.

Operators apparently did everything within their power to extinguish the fire. All of the carbon tetrachloride extinguishers were emptied on the fire, but apparently with little or no effect. Unsuccessful efforts were made to run a hose and pipe line from the carbon dioxide cylinders in the basement, also to use two $\frac{3}{4}$-inch garden hose lines. After all extinguishers had been emptied there was little the operators could do until the fire burned itself out.

The fire had been in progress for about an hour when a dull explosion occurred in the generator room, blowing out all windows in the generator room and a few in the boiler room. Immediately following the explosion all operators left the plant. Fortunately no one was injured. Several other minor explosions followed. The chief engineer of the plant described these explosions as "puffs" and it is evident that they were not violent.

Following the first explosion the carbon dioxide system, protecting the generators, was manually tripped to prevent the entrance of fire to the generator and to protect the insulation from damage by heat. The fire burned for about 40 minutes following the first explosion, the entire duration of the fire being about one hour and forty minutes.

The operators re-entered the plant after the explosions and, as the fire gradually burned out, did what was possible to prevent further damage. The four soda-acid extinguishers were procured from the tool room as soon as the fire died down enough to permit access to this room. These were discharged on the remaining fire which was burning in the oil-soaked asbestos insulation on pipes below the oil reservoir and extinguished the blaze. Fire continued to



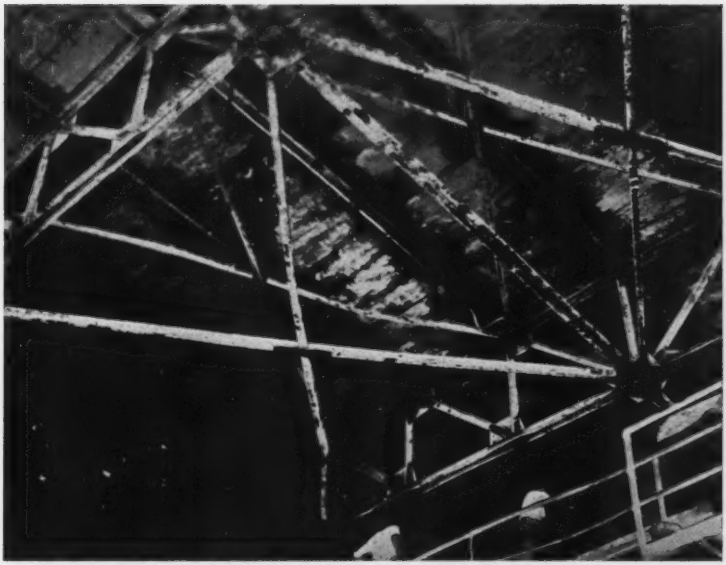
View of the turbine after the fire.

break out during the night in the asbestos covering on steam lines, which had been saturated with the leaking oil; these blazes were extinguished with garden hose.

**Damage.**

A high pressure turbine was seriously damaged and other equipment in the vicinity was more or less injured. Cables and conduit under the floor near the damaged machine were destroyed. Unit No. 1 was not affected and was put back into service, using temporary cable, within two hours after the fire.

There was evidence of intense heat in the generator room. The damage to the roof was such as to require the replacement of several unprotected steel roof trusses, which were badly warped, and a portion of the roof slab. The temporary north wall of unprotected steel construction was practically a total loss. Glazed brick trim in the generator room was badly cracked, and the north portion of the west wall of the generator room was so damaged as to require replacement. A sixty-ton traveling crane which happened to be directly over the fire was badly damaged. The entire building, including the boiler room, suffered from smoke damage. This was probably due to the fact that the boiler room roof is higher than the roof of the generator room and acted as a flue for fire and smoke. All the windows in the generator room and part of the windows in the boiler and control room were blown out by the explosion. Approximately 650 gallons of oil were destroyed by the fire.



View showing damage to roof of generator room.

Pending the completion of repairs and replacements the exact amount of the loss is not known, but it is estimated at approximately $400,000.

### Conclusions.

This fire is similar in many respects to the recent Indianapolis Power and Light Company plant fire, and it serves to further emphasize the potential hazard of central oiling systems involving large quantities of oil and the possibility of heavy losses in steam turbo-generator installations, especially in those where high temperature steam is utilized. Minor fires from oil drippings or leaks on insulated and uninsulated high temperature steam pipes are not infrequent, and losses may be expected unless adequate first aid equipment sufficient to cope with such oil fires is available and is promptly and effectively used by plant operators. Serious consideration should be given the arrangement and installation of pipes in lubricating system, especially the smaller size pipes and that portion of system that it is necessary to fabricate in the field. Plant operators and manufacturers' service men should be thoroughly instructed in the proper maintenance of the entire lubricating system.

Since the fire at Indianapolis, experiments have been conducted to perfect a new type of lubricating fluid with a flash point much higher than ordinary lubricating oil, and it is understood that this fluid has been tested by the Naval Laboratories and found to be satisfactory.

With slight additional expense it appears that considerable improvement

can be made in present and future installations. Each installation will probably present a different problem, but the following general suggestions are offered for the consideration of utility companies and manufacturers of equipment:

1. All piping for lubricating system should be of substantial construction, rigidly installed and safeguarded from possible mechanical injury. Welded joints should be used wherever practical and threaded connections eliminated. Provide suitable control valves on all gauge lines at point of attachment of gauge line to lubricating system proper. Isolate oil piping from high pressure steam pipes wherever practical. Oil piping should preferably be on opposite side of turbine from steam supply pipes. Provide rigidly constructed shields or baffle plates for any high pressure steam pipes that may ignite dripping or spraying oil in case of a leak or rupture in lubricating system. Baffle plates or shields should be so installed that they will not interfere with any necessary repairs on steam or oil pipe lines.

2. Lubricating system of each unit should be so designed and installed as to permit quick drainage of all oil from the area of any fire without impairing the lubricating system to bearing service.

3. Serious consideration should be given to the elimination of all oil reservoirs near turbines and the pumping of oil from reservoirs or tanks at remote locations.

4. All pipes and surfaces using steam exposed to possible contact with oil from fracture of oil lines or otherwise should be properly and efficiently covered with high quality fire-resistive insulating material of adequate thickness and with an outer or skin covering of oilproof material, applied in such a manner as to prevent the absorption of oil.

5. Hinged covers, arranged for self-closing, should be provided for openings in oil reservoirs.

6. Provide adequate first aid equipment, including wheeled type carbon dioxide and/or foam extinguishers.

7. Consideration should be given to the design of a suitable foam or carbon dioxide system for the protection of oil reservoirs. The use of steam jets of proper design for supplementing this protection should also be considered. Permanently connected systems are desirable, but if such an arrangement is considered impractical on account of fear of leakage into oil reservoir, an optional arrangement would be to provide a suitable coupling or connection in pipe line at a remote location that will normally remain disconnected, but which may be quickly connected before opening the control valve of protection system.

# Chicago Elevator and Packing House Fire.

**Report by Chicago Board of Underwriters,**
**(Member N.F.P.A.).**

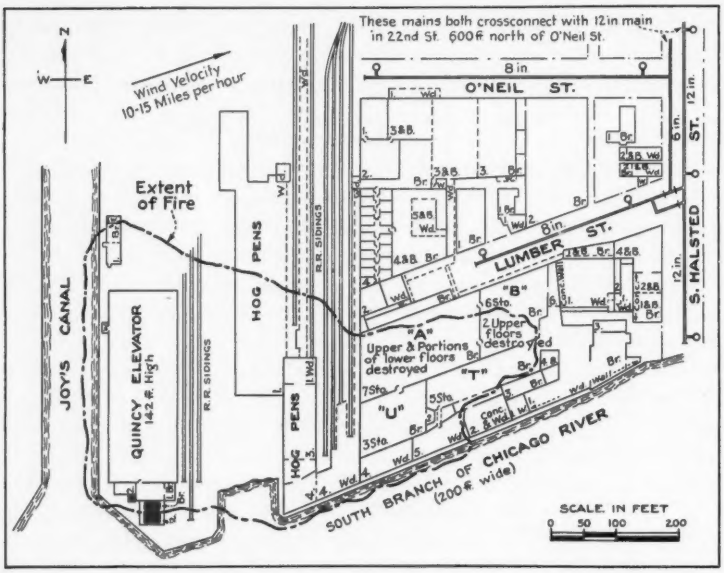
Damage estimated from one to two million dollars was caused by a fire which, on August 4, 1932, totally destroyed the Quincy Elevator, so called, situated on the banks of the South Branch of the Chicago River and severely damaged the plant of the Omaha Packing Company adjoining. The grain elevator in which the fire started was so located in relation to city water supplies as to preclude the use of fireboats in event of a serious fire and this isolation was a contributing factor in this particular fire.

Two factors stand out as being responsible for the magnitude of the fire. To begin with, there apparently was considerable delay in calling the fire department, for the entire upper structure of the elevator was in flames when the first companies arrived, and no one could be found in the vicinity at the time of the fire who noted any evidence that the fire started from an explosion. In the second place, the fact that the nearest fire boat, which is located only a few blocks west of the elevator, was out of service for repairs and the second fire boat did not arrive until nearly an hour after the first alarm, due to a half hour delay at a bridge, permitted the fire to attain serious proportions in the packing plant before it could be effectively fought by heavy streams from the fire boats.

### Description of the Property.

The grain elevator where the fire originated is located on the north bank of the South Branch of the Chicago River, immediately adjoining Joy's Canal. It was owned by the Chicago, Burlington and Quincy Railroad; operated by the Stratton Grain Company, and had a capacity of about 1,500,000 bushels. At the time of fire, it was reported to have contained about 946,000 bushels of grain, consisting principally of wheat, with some corn and oats. The elevator was of the usual cribbed construction, with masonry foundation and brick walls on the first floor and frame, slate and metal clad above. The roof was of metal and approved composition on wood boards on ordinary joists. The floors were all of wood construction. Stair and elevator shafts were properly enclosed, but the power drive shaft was not properly enclosed on the main floor. The elevator communicated to a one-story brick joisted power house. Watch service was maintained, reporting to a Central Station.

The packing plant of the Omaha Packing Company, which soon became involved in the fire, was located immediately west of Halsted Street, on the north bank of the South Branch of the Chicago River, about 250 feet east of the grain elevator. It consisted of large area one-story frame hog sheds




and pens located between the two properties, which fostered a communication of the fire from the elevator. The packing plant consisted largely of ordinary brick joisted construction, of from one to seven stories in height, with communicating frame or frame tin-clad fertilizer storage and fertilizer dryer section and runways on the south immediately adjoining the Chicago River.

**Fire Protection.**

The elevator was equipped with a standpipe system with five outlets on the main floor and three or four outlets on each floor above, equipped with 50 to 100 feet of hose on each outlet, and supplied by a 1000-gallon per minute non-automatic steam fire pump. It has not been determined whether this equipment was used to combat the fire in its early stages, but the Chief Engineer of the elevator stated that he shut down all the machinery and started the fire pump as soon as the fire was discovered.

The grain elevator was rather isolated from city water mains and hydrants as there are no through streets running south from 22d Street to this risk, and the nearest hydrants are located on one 4″ and two 8″ dead end mains extending west from Halsted Street. The water mains in Halsted Street and 22d Street, the nearest through streets, are of adequate size and are interconnected. Adequate pressures were maintained on these mains by the pumping stations throughout the fire. However, the location of the buildings involved, and the extent of the fire, necessitated use of heavy streams from fire boats for effective fire fighting.

The packing plant maintained a private fire department consisting of five men on duty at all times. Standpipe and hose equipment, supplied by a 1000-gallon manually controlled steam fire pump, was installed throughout the buildings.

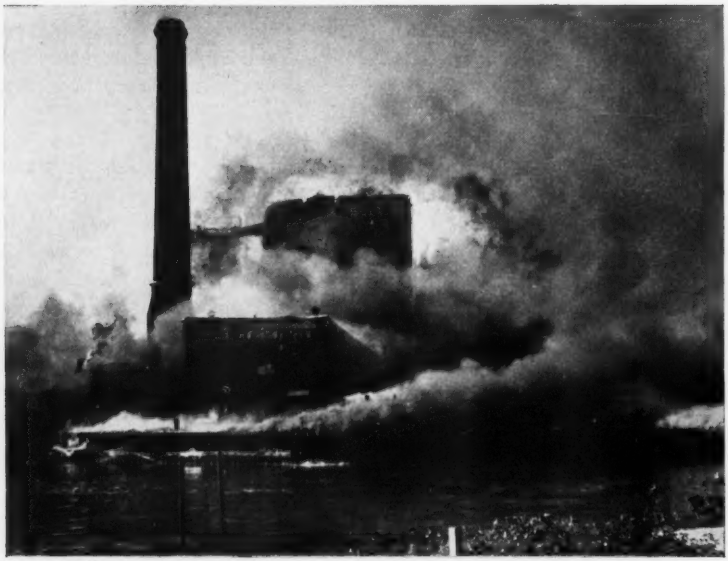
### Story of the Fire.

It was reported by employees at the grain elevator, that the fire originated in the south end of the elevator apparently in the shaft housing the rope drive. The rope used to transmit power was said to be three years old, but in good condition. The cause of the fire is unknown, but there seems to be no evidence of an explosion noted by anyone present in the vicinity at the time. An alarm of fire was transmitted by employees of the grain elevator to the Illinois District Telegraph Company by use of combined night watch and fire alarm boxes with which the risk was equipped. One box located on the bin floor and one on the first floor, both at the north end of the elevator, were pulled simultaneously at 3:28 P.M. These alarms were transmitted by the I. D. T. Central Office to the city fire alarm office which was receiving, at the same time, an alarm from a city fire alarm box located about 125 feet north of the elevator, also pulled by an employee.

The city box alarm at 3:28 P.M. was followed by a 4-11 alarm at 3:31 P.M. and a 5-11 at 3:36 P.M. At 3:45 P.M. the Chief of the First Division sent in a special call for ten engines and five were sent immediately, and five more at 3:48 P.M. At 3:51 P.M. another special call for five engines was sent in and the fire boat located in the Calumet River at the 92d Street bridge was called. Three more special calls were sent in for five engines at 4:12, 5:32, and 6:43, bringing the total response at the fire to 52 pumpers (including two fire boats), five trucks, four squads, two high pressure wagons, two water towers, two light wagons, two ambulances and one Insurance Patrol.

On the arrival of the fire department at the fire the entire upper structure of the elevator was in flames, and the firemen concentrated their efforts in an attempt to prevent the spread of fire into the Omaha Packing Company plant to the east. Engine companies were located at hydrants along 22d Street and lines were stretched south along the railroad tracks for about 1000 feet to the elevator. On account of the distance, lines were relayed to an intermediate pumper to give satisfactory pressure and delivery at the fire. Pumpers were located at hydrants on Halsted Street and on John, O'Neil, and Lumber Streets. Lines from the engines at the Lumber and Halsted Street hydrants were used from the roof of the packing plant to protect the hog sheds and pens, and from the upper floors to prevent spread of fire from the sections along the river which were already involved.

The Omaha Packing Company buildings probably would not have been involved in the fire if heavy streams from the fire boat had been available on the first response of the fire department, in spite of the unfavorable direction of the wind which carried the flying brands and heat directly over to the frame



*International.*

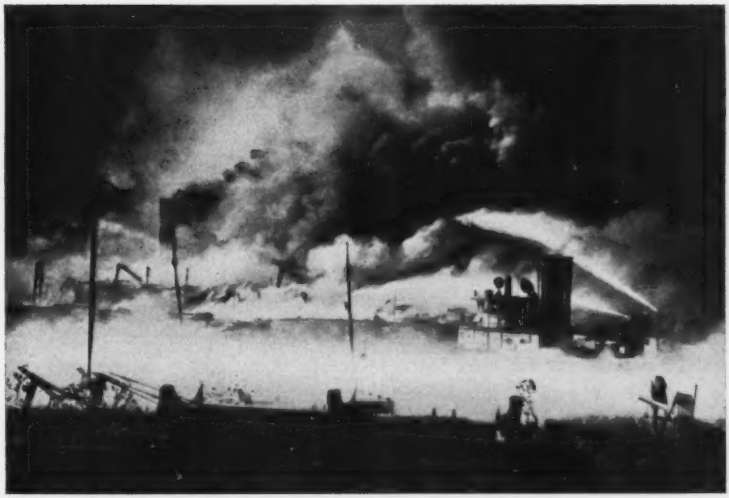
**The Quincy Grain Elevator at the height of the fire. The fire originated in this unsprinklered combustible elevator and soon spread to the buildings of the packing plant which are hidden by the smoke at the right of the picture.**

hog sheds and pens which communicated directly with the frame and tin clad south sections of the Omaha Packing Company. It was impossible for land companies to work in the area between the elevator and hog sheds and pens on account of the dense smoke and intense heat radiated by the burning elevator.

The fire boat, *Illinois,* which is ordinarily stationed at a point only about 2000 feet west of the grain elevator, had been out of service for repairs for about five weeks and was not available for this fire. Its response, however, was covered by another fire boat, the *Graeme Stewart,* stationed in the Chicago River at Franklin Street, which probably would have been able to protect the south end of the hog sheds and pens, had it not been delayed for about thirty minutes at the Pennsylvania Railroad bridge near 19th Street, due to the inability of the bridge tenders to open the bridge. This fire boat did not arrive at the fire until about 4:20 P.M.

A second fire boat was summoned at 3:51 P.M., but on account of the circuitous route necessitated to reach the fire, did not arrive until about 6:20 P.M. It was stationed beside the *Graeme Stewart* and assisted in extinguishing the fire in the packing plant.

By this time the fire had involved the entire south half of the hog sheds and pens, and the frame tin-clad fertilizer storage shed and runways of the



*International.*

**The $2,000,000 elevator and packing house fire, Chicago, August 4, 1932. The delay of nearly an hour in the arrival of the fire boat, due to inability to open one of the drawbridges in the Chicago River, contributed largely to the extent of the loss.**

packing plant, and was gradually extending north into the three and five-story slaughter house sections "U" and "T" (see diagram). The fire boat took a position immediately adjoining the packing plant toward the west end of the property and used the monitor nozzles and hand lines in an effort to check the fire at this point. The private fire department of the packing plant was ordered to close all fire doors between sections in an effort to prevent the spread of fire into sections "A" and "B" to the north. They also made good use of the standpipe and hose equipment.

In spite of the efforts of the fire department, section "U" was entirely destroyed and section "T" was burned practically to the first floor. The fire also penetrated into sections "A" and "B," involving the upper floors of both sections, and parts of the lower floors of section "A." It seems probable that the fire traveled through a meat hoist extending up from section "U," which opened into section "A" on the upper floors, as the condition of the fire doors indicated that these doors were open during the fire. There was also a poorly protected opening for a hook conveyor, which showed evidence of having transmitted fire. Shortly after 11:00 P.M. about twenty feet of the west wall and fifty feet of the south wall of section "A" collapsed.

The firemen were severely handicapped in fighting the fire in sections "A" and "B" of the packing plant due to the fact that these sections contain numerous coolers on most of the upper floors, which made it difficult to

ventilate the building sufficiently to allow men to enter, even though gas masks were used by the firemen in an effort to accomplish this.

The other sections of the packing plant, located south of Lumber Street, were not involved in the fire, but suffered moderate to considerable water damage. The north portion of the frame hog sheds was saved. The sections located north of Lumber Street suffered no fire loss and apparently very little, if any, water damage. The fire was under control shortly after 11:30 P.M., but several companies were left on the premises for the next two days to prevent a rekindling of the fire. Several firemen were injured, but fortunately not fatally.

A number of freight cars standing on the railroad tracks just west of the packing plant were more or less severely burned, and several boats located on the south side of the river were damaged. A number of buildings located north of the sections of the packing house involved in the fire suffered minor losses mainly from burning brands and water damage.

### Loss.

The grain elevator, where the fire originated, was a total loss although there may be considerable salvage on the grain stored therein. The loss to the Omaha Packing Company buildings has been estimated in the neighborhood of $500,000, but the loss to the contents is not known as the amount of salvage is uncertain. There were about 200 sheep, 70 cattle and 1000 hogs destroyed in the fire. The hogs, which were in the pens and hog sheds, were driven up into the packing house when the hog sheds became involved and when the fire extended into these portions of the plant, they too were destroyed. The total loss to all property involved in the fire has been estimated by various authorities to be in the vicinity of $2,000,000.

# St. Louis Bus Garage Explosion and Fire.

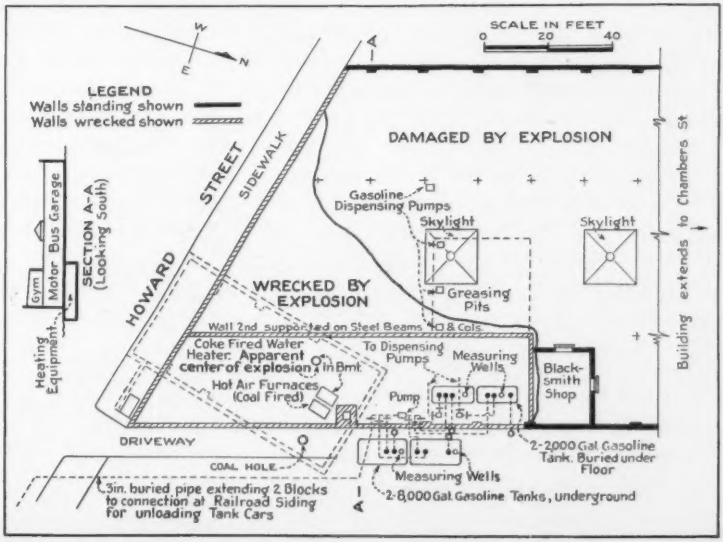
**Report by St. Louis Fire Prevention Bureau,**
**(Member N.F.P.A.).**

A violent explosion with a fire of small extent occurred at 8:50 A.M., July 25, 1932, in the terminal garage repair shop and service station for motor busses occupied by the Western Greyhound Lines as their St. Louis terminal garage. One employee was killed, several others injured, part of the building was completely destroyed, and considerable damage was done to other portions.

### Construction and Occupancy.

The building was a one and two-story structure, arranged as shown in the accompanying diagram. The entire building was used as a passenger motor bus terminal garage repair shop and service station. The capacity was about 40 busses, although only a few were in the building at the time. The basement, which extended under only a part of the area, contained two hot air furnaces, a coke-fired water heater, and other equipment.

Gasoline was stored in underground tanks located as shown on the plan. There were two 2000-gallon tanks buried under the first floor which were supplied by pumping from two 8000-gallon tanks buried underground about 18 inches outside the building, these larger tanks being filled through a pipe line buried in the street leading from a tank car unloading point on a railroad siding two blocks distant.



*Acme.*

**One man was killed, several were injured, and property was damaged to the estimated amount of $50,000 in this St. Louis bus garage on Aug. 15, 1932, when leaking gasoline ignited.**

### Story of the Fire.

Investigation by inspectors of the St. Louis Fire Prevention Bureau and by the St. Louis police indicate that just before the explosion occurred one of the 8000-gallon outside storage tanks was being filled from a tank car on the railroad siding by a negro employee, that the gasoline overflowed through the measuring well in top of the tank, forming a pool of gasoline on ground. At the Coroner's inquest, the negro conducting the filling operations refused to testify, but testimony by others was to the effect that the negro was seen sweeping the overflowed gasoline through the coal hole in the near-by driveway down into the furnace room and that the explosion followed. It is supposed that the vapors from the gasoline being swept into the furnace room ignited from the coke fire under a hot water heater which was understood to be in daily use, although it has been denied that there was fire under the heater at the time, and the manner of ignition is not fully established, but examination on the day following the explosion indicated that the water heater was the center of the explosion.

The force of the explosion wrecked or damaged about 130 feet of the south end of the building which included the two-story and basement part, and windows and skylights in all parts were blown out. The steel columns and beams supporting the concrete ceiling over the basement were distorted, twisted and sheared, part of the 18 in. stone foundation wall was shattered,

a section of concrete basement ceiling slab was blown into the vacant lot east of the building, and the explosion, venting through the furnace room ceiling, completely wrecked the southeast section of the first story and the entire second story. Two large motor busses in the building were damaged, three private passenger automobiles parked outside the east wall were demolished and buildings on surrounding streets sustained damage consisting mainly of broken windows. Fire, which followed the explosion, was quickly extinguished by the fire department which responded to a first and second alarm.

# Superior Refining Co. Fire, St. Paul.

Report by John Townsend,
St. Paul Fire Insurance Patrol (Member N.F.P.A.).

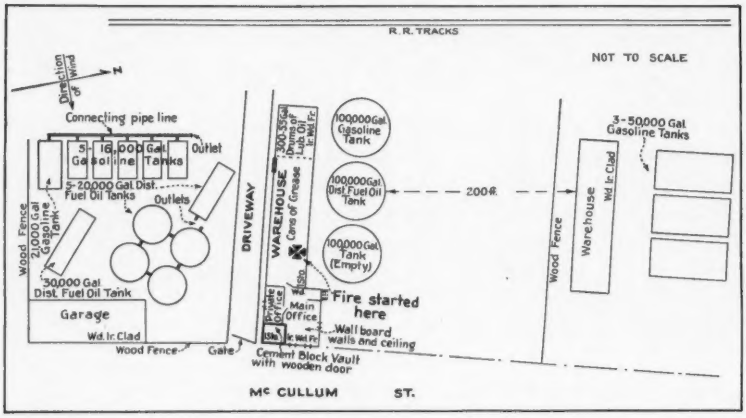
A fire on August 19, 1932, practically destroyed the warehouse of the Superior Refining Co. at Eaton and McCullom Streets, St. Paul, caused an extensive loss to stocks of gasoline and oil, and considerable damage to tanks and pipe connections. At the time the fire was discovered, two men were welding a 100,000-gallon steel tank about 8 feet from the warehouse, which was set on piles about one foot from the ground. It is thought that a spark from the acetylene torch got under the floor of the warehouse and ignited some old lumber stored there, there being no other possible cause to account for the fire.

### Construction of the Warehouse.

The warehouse was a one-story structure, built of wooden studding sheathed with galvanized iron siding. The front of the building was 30 feet wide and ran back for 30 feet at this width, where an ell cut the width down to 20 feet on the north side; it then ran back for 95 feet (see diagram). The front part of the building, 30 feet deep, was partitioned off by matched siding with one doorway closed by an ordinary wooden door; this formed the general office. Wallboard was used for the interior finish of the main office walls and ceilings, and also for the adjoining private office. In the southeast corner a vault of cement blocks had been built for the storage of records. This was closed by a wooden door. The rest of the warehouse was unfinished. There were four windows in the office set in wooden frames, two in the warehouse and one sliding door in the warehouse that opened on the south side. The floors were of pine laid on wooden joists throughout. The only exposure within 800 feet was an iron-clad building about 200 feet north of the large tanks. There were also three 50,000-gallon tanks of gasoline about 40 feet north of this building, but none of this property was involved in any way by the fire.

### The Fire.

The first alarm was turned in by telephone by one of the members of the firm at 1:25 P.M. He was told of the fire by the two men who had been doing




**Diagram, showing point of origin of fire and location of tanks. A railroad siding, not shown on this plan, ran close to the tanks and warehouse.** (See photograph, page 167.)

the welding. Two engine companies, one truck company, one squad, a district chief and the fire insurance patrol responded to this alarm. By the time the fire department had reached the scene of the fire it had swept through the warehouse and ignited the tanks of distillate fuel oil south of the building. Lines of hose were laid and water was played on the warehouse and tanks, but without much effect. At 1:26 P.M. Box 724, located about two blocks away, was pulled by someone passing by that saw the smoke and flames, which were discernible for at least half a mile. One engine company and one truck company, together with the chief and assistant chief, responded. More lines of hose were laid and water was played on the 100,000-gallon tanks on the north side of the warehouse and the battery of 16,000-gallon tanks on the south to keep them cool.

The building and tanks were situated in a rather low area and in a short time water several inches deep covered the ground and served to carry burning oil under the battery of 16,000-gallon tanks of gasoline and the 20,000-gallon tank of fuel oil just south of the warehouse. The heat caused by this broke some of the pipe connections, which released more fuel for the fire.

At 1:29 P.M. a two-eleven alarm was turned in, which called out two more engine companies. By this time the fire had reached such proportions that it was just a question of saving some of the tanks not already involved by the fire. At 1:40 P.M. two more engine companies were called, and at 2:00 P.M. one engine company and about 100 firemen of the off shift were called. Six lines of hose were laid across the railroad tracks. Two lines were played on the 100,000-gallon tanks, two on the rear of the warehouse and the other two on the battery of 16,000-gallon tanks. The section of the warehouse where

*St.Paul Daily News.*

**The Superior Refining Co. plant after the fire, showing ruins of warehouse in foreground. The gasoline tanks at the left were saved through efforts of the fire department. The contents of horizontal tanks at the right as well as the upright fuel oil tanks at the rear were destroyed.**

the fire originated had caved in and two lines were laid on that breach, one was played through the front windows of the office while the other three were used to drive back the fire from the north side of the garage and cool off the horizontal tanks of fuel oil. These tanks had not ruptured, but oil was running from the broken connections. There was literally a river of burning oil running out from the driveway into McCullom Street; the only way this could be stopped was by holding the lines low and pushing it back by the force of the water from the hose.

The Fire Insurance Patrol, upon arriving at the fire, found that it would be useless to protect the office furniture, as the fire was already burning above the wallboard ceiling and through the doorway from the warehouse, so they salvaged furniture by carrying it outside and covering it with a tarpaulin.

**The Vault Saved Despite Wooden Door.**

Attention was then directed to the vault. It was too dangerous to take a hose line into the office because of the danger of explosion, but the woodwork near the vault was carefully watched by the Insurance Patrol, and whenever the woodwork caught fire it was extinguished by a hose line directed through the windows. This had to be repeated at frequent intervals. By 3:00 P.M. the wooden studs of the wall enclosing the office on the south side had been burned through sufficiently so that the whole section of wall could be pushed out on that side, thereby tearing away a good deal of combustible material near the vault. The men working inside the office were forced to jump through the windows several times on account of small explosions that occurred in the warehouse and threatened to involve the entire office, but by concentrating four or five hose streams through the windows the flames were driven back and the vault was saved.

**Gasoline Escapes from Pipe Connections.**

By about 3:30 P.M. the first two 20,000-gallon tanks (upright), the 20,000-gallon horizontal tank of fuel oil and the first three tanks of gasoline in battery were in flames. The heat was so intense that the firemen were forced back to the railroad track about 100 feet away, and then only by spraying themselves frequently with water could they stay there. Fortunately what little wind there was blew from the west, while on the other side of the fire the heat from the burning fuel oil was not so intense. From this time on it was just a battle to see who would win the remaining tanks, the fire or the firemen. While the ruins of the warehouse were fairly under control, a stream of burning gasoline kept running down the ditch beside the railroad tracks and threatening to ignite the 100,000-gallon tank of gasoline. But this was kept headed off by hose streams.

By 4:00 P.M. so much water had been poured on the fire that the surrounding territory was in danger of being flooded with water-covered oil. An emergency call was sent in to the Department of Public Works and 25 men were rushed to the fire with picks and shovels. They immediately dug trenches to carry off the water to some low land that was not occupied. The six tanks of gasoline were all connected and the tanks not involved by fire siphoned their contents to the seat of the blaze, giving the firemen a great deal of trouble. The same was true of the fuel oil tanks. About six o'clock two firemen, by walking behind a water curtain, were able to shut off some of these valves. By 9:00 P.M. the fire was under control and by 3:00 A.M. the next morning the fire was completely extinguished. It was very fortunate that there were not more casualties. One fireman was seriously injured by the back kick of a hose line when forced to drop the line on account of an explosion, and one or two were slightly burned.

**The Loss.**

On inspection next day the warehouse was found to be a total loss, four of the tanks in battery were destroyed, the 20,000-gallon horizontal tank of fuel oil was destroyed, and extensive repairs were necessary on most of the other tanks. About 100,000 gallons of gasoline, 85,000 gallons of fuel oil, and 20,000 gallons of lubricating oil were lost, besides the entire contents of the warehouse, which consisted of 5,000 pounds of grease and other products sold by this firm. The total loss in this fire is estimated at $50,000, the insurance loss paid was about $40,000.

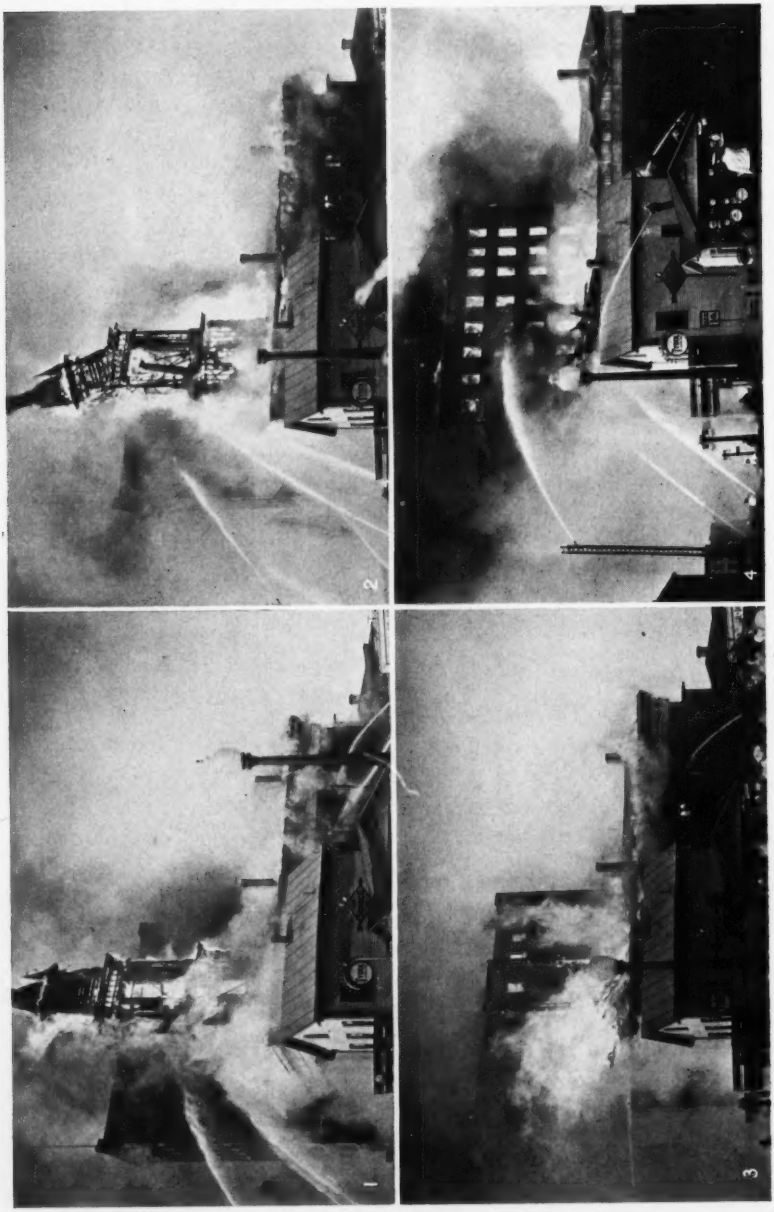
**Lessons of the Fire.**

There has been much discussion since this fire as to whether or not a foam generator could have been used to good advantage. Had such a generator been on hand at the start of the fire there is no doubt that some of the tanks could have been saved, but as it has been stated before, the fire had gained such headway by the time the fire department arrived it would have

been impossible to extinguish it for some time even with a generator. It is questionable whether even with a foam generator the flowing burning gasoline could have been extinguished, but foam could doubtless have been used to good advantage in preventing the ignition of or extinguishing fire in the oil that flowed under the battery of gasoline tanks.

It was obvious from an inspection of the tanks, that once a fire started in this property a serious fire was almost inevitable. None of the tanks were dyked, quite a few of them were connected by pipes with the shut-off valves in such inaccessible places that it was impossible to shut them off after the fire had started, and there were no first aid fire appliances on hand except a few soda and acid extinguishers. The oil storage plant was built before the passage of the present ordinance which agrees with N.F.P.A. recommendations for the storage and handling of flammable liquids.

The recommendations to be made in this case are that the Superior Refining Company follow the city ordinance, which of course they will be compelled to do. Among the major points are these: all tanks to be properly dyked, valves to be of the self-closing type, tanks to be equipped with flame arrestors on the safety release valves, at least one foam generating system be installed to cover the larger tanks, and two 40-gallon foam type portable fire extinguishers be kept on hand.



# Auburn, N.Y. Church and Masonic Building Fire.

On August 17, 1932, Auburn, N. Y., experienced its second large loss fire in six months. The photographs of the fire, reproduced on the opposite page, furnished by the courtesy of Chief Fred J. Washburn of the Auburn Fire Department, show clearly the progress of the fire, which was very well handled by the fire-fighting forces.

The fire originated in a church building that dated from 1830. It was first seen in the cornice. The cause of the fire is unknown, but ignition may have occurred from a cigarette or match thrown from a window of the nine-story Masonic Building, which was located within five feet of the church.

The alarm for the fire was received at 3:42 P.M. and within five or six minutes fire had involved the cupola. The picture marked No. 1 was taken at 3:54 P.M., about twelve minutes after the first alarm. Picture No. 2, taken two or three minutes later, shows the collapse of the cupola.

A strong wind, estimated at 25-40 miles per hour, was blowing directly across the church against the Masonic Building which had no protection whatsoever against exposure. Pictures Nos. 3 and 4 show the further progress of the fire. The Masonic Building was first ignited on the ninth floor and burned down to the fourth floor. The floors below were ignited by flying embers in about ten different places. These fires were all extinguished before they had spread. The lower floors were all water soaked and the damage to the entire building was very heavy.

Fire apparatus concentrated at this fire included seven pumpers, two deluge sets, a ladder pipe from an 85-foot aerial ladder, 11,100 feet of hose, 570 feet of ladders, 85 men, and a large number of volunteers. Twenty-five streams were in operation and were effective in preventing the further spread of this fire, but owing to the rapid spread of the initial blaze in the church building and the lack of any protection against this severe exposure five feet distant, it was not possible to prevent the spread of the fire to the Masonic Building. Sparks from the fire carried at least a mile, but were prevented from doing further damage by the efforts of firemen and property owners who kept combustible roofs wet down. The fire caused a loss estimated at more than $250,000, including smoke and water damage to a number of other buildings in the vicinity.

# Mercantile Fire Record.

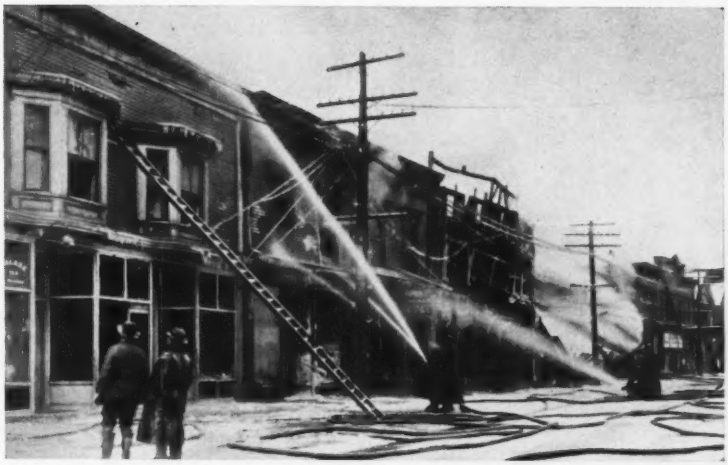
The importance of retail mercantile establishments in the economic life of the country is indicated by statistics contained in the U. S. Government Census of Distribution. In the year 1929 (the latest for which figures are available) the total number of retail stores in the United States, exclusive of those dealing in automobiles, building materials and restaurants, was 1,080,333. Their total net receipts amounted to $34,753,000,000.

The files of the Department of Fire Record of the National Fire Protection Association contain reports on approximately forty-seven hundred retail mercantile store fires, exclusive of automobile salesrooms, lumber and building material yards, restaurants and department stores. The first mercantile fire record appeared in the QUARTERLY for July 1923 (page 80) and was based on reports of 2212 fires which had been filed up to that time. The present tabulations bring the fire record up to date.

The exclusion of department stores, including large chain stores handling a wide variety of merchandise, from this fire record is due to two reasons. In the first place the potential fire hazards of stores of this character are directly affected by the inclusion under one roof or in a single establishment of large stocks of varying kinds of merchandise, much of it highly combustible, and the presence of special hazards such as restaurants, kitchens, and other departments involving special fire protection consideration. Moreover, for the most part, such stores represent a better grade of management and maintenance. Private fire protection facilities are more adequately provided and better cared for, and greater stress is laid upon the importance of fire prevention.

In making up the accompanying statistical data, reports covering the period from January 1, 1923, to September 1, 1932, have been included. The 2434 fires thus analyzed have been tabulated so as to form a continuation of the tables published in the previous fire record. One change may be noted, however. Fires occurring in those buildings occupied by various types of occupancy and where more than one occupancy has been involved are classified by the Department of Fire Record as "Multiple Occupancies." Due to difficulties incidental to so doing, these fires have not been included as part of the present mercantile fire record.

The record is by no means complete and does not include many of the small fires which are occurring daily in mercantile properties. Insurance inspection bureau reports are the source of data on the majority of mercantile fires, supplemented by reports based on newspaper accounts which have been verified through the coöperation of N.F.P.A. members.



*International.*

**Inferior construction was largely responsible for the fire which swept a row of frame mercantiles in a small town. "Exposure" ranks sixth as a cause of mercantile fires.**

In view of the character of the original data, which include the larger and more important fires but not a fair proportion of the small fires, this record may not be completely representative. The record, however, includes a sufficiently broad selection of the important mercantile fires so that there can be no question as to the validity of conclusions drawn in the tables here. The fires analyzed in this fire record are divided into seven distinct classes as indicated by the table which follows.

| Kind of Store | Sprinklered Property | Unsprinklered Property | Total |
|---|---|---|---|
| Dry Goods Stores | 289 | 136 | 425 |
| Furniture Stores | 152 | 128 | 280 |
| General Stores | 2 | 82 | 84 |
| Grocery Stores | 175 | 127 | 302 |
| Hardware Stores | 97 | 88 | 185 |
| Shoe Stores | 65 | 26 | 91 |
| Miscellaneous Mercantiles | 607 | 460 | 1067 |
| Total | 1387 | 1047 | 2434 |

The first six classes are self-explanatory. "Miscellaneous Mercantiles" provides for a variety of classes, including book stores, candy stores, cigar stores, drug stores, jewelry stores, music stores, etc., in which an insufficient number of fires have been recorded to form separate occupancy classes.

The following table shows the causes of fires for all classes of mercantile establishments. It is interesting to note that, as in the previous record, common causes predominate in the tabulation of known causes.

## Causes of Mercantile Fires.

| Cause | | No. of Fires | Per Cent of Known Causes |
|---|---|---|---|
| Matches—Smoking | | 317 | 21.4 |
| Electrical Causes | | 221 | 15.0 |
| Ignition of rubbish or litter* | | 211 | 14.3 |
| Probably from careless smoking | 111 | | |
| By sparks from boiler | 14 | | |
| From unknown cause | 86 | | |
| Defective or overheated heating equipment | | 163 | 11.0 |
| Defective or overheated stoves and furnaces | 121 | | |
| Defective oil burning equipment | 42 | | |
| Spontaneous ignition | | 152 | 10.4 |
| Oily materials | 75 | | |
| Rubbish and litter | 47 | | |
| Painters' materials | 17 | | |
| Soft coal | 6 | | |
| Miscellaneous | 7 | | |
| Exposure | | 91 | 6.2 |
| Incendiary | | 54 | 3.7 |
| Flammable liquids, ignition of | | 46 | 3.1 |
| Electric iron left on | | 43 | 2.9 |
| Defective chimneys and flues | | 42 | 2.8 |
| Other known causes | | 133 | 9.2 |
| Total known causes | | 1473 | 100.0 |
| Unknown—suspicious | | 43 | |
| Unknown | | 918 | |
| Total | | 2434 | |

"Matches—Smoking" as usual predominates as a fire cause. It is perhaps difficult to enforce "No Smoking" rules in mercantile establishments where many people not in the employ of the establishment are necessarily in the store or building, but it would seem reasonable that by good housekeeping, the posting of proper warnings, and the provision of adequate receptacles for discarded matches and cigarette butts, this hazard could be reduced.

Electrical causes claim their usual share of fires, with defective wiring and short circuits indicated as the major factors. Fires classified under this cause are the only ones which, admittedly, might be considered partly unpreventable.

As for the ignition of rubbish and litter no possible excuse exists for a single one of the 211 fires included in the record. Good housekeeping is a primary requisite of fire safety and no excuse exists for the store whose basement and under-counter spaces are choked with packing material and floor sweepings.

*While commonly referred to as a fire cause, "Rubbish" of itself is not a cause of fires but is classed as such because rubbish accumulations so often furnish the fuel necessary for the starting of fires by the careless disposition of cigarettes or matches, and sparks from various sources.

Defective and overheated heating equipment as a fire hazard is primarily a winter hazard and careful attention to the heating plant prior to its operation in the fall and care in handling the equipment during its operation will do much toward eliminating fires and losses from this cause.

The analysis of losses for the entire mercantile class which follows, indicates that nearly 45 per cent of the 2434 fires involved losses of $5000 or over. This clearly indicates the need of concentration of fire prevention efforts in this class of occupancy, a need well recognized by the fire prevention bureaus of modern city fire departments.

### Analysis of Loss in Mercantiles.

| | Sprinklered Fires | Per Cent | Unsprinklered Fires | Per Cent | Total | Per Cent |
|---|---|---|---|---|---|---|
| Small loss | 1168 | 84.2 | 161 | 15.4 | 1329 | 54.6 |
| Large loss* | 213 | 15.4 | 867 | 82.8 | 1080 | 44.4 |
| No data | 6 | .4 | 19 | 1.8 | 25 | 1.0 |
| Total | 1387 | 100.0 | 1047 | 100.0 | 2434 | 100.0 |

*Large loss fires are those involving loss of $5000 or over.

The value of automatic sprinkler systems in mercantiles is shown by the fact that 84 per cent of the fires in sprinklered buildings were small loss fires and that in 98 per cent of the 1120 fires in which sprinklers operated the sprinklers either extinguished the fire completely or held the fire in check.

### Sprinkler Fire Record.

| Effect of Sprinklers | No. of Fires | Per Cent |
|---|---|---|
| Extinguished Fire | 944 | 84.3 |
| Held Fire in Check | 154 | 13.7 |
| Total Satisfactory | 1098 | 98.0 |
| Unsatisfactory | 22 | 2.0 |
| Total | 1120 | 100.0 |

There were 267 fires in sprinklered property in which no sprinklers operated.

| No. of Heads Opening | No. of Fires | Per Cent |
|---|---|---|
| 1 | 582 | 51.9 |
| 2 | 240 | 21.5 |
| 3 | 118 | 10.5 |
| 4 | 61 | 5.5 |
| 5 | 24 | 2.1 |
| 6-9 | 40 | 3.6 |
| 10-25 | 38 | 3.4 |
| 26-50 | 6 | .5 |
| Over 50 | 8 | .7 |
| No Data | 3 | .3 |
| Total | 1120 | 100.0 |

### Comparison of Wet and Dry Systems.

| | Wet System | Per Cent | Dry System | Per Cent | No Data | Total | Per Cent |
|---|---|---|---|---|---|---|---|
| Extinguished Fire | 762 | 85.3 | 158 | 79.8 | 24 | 944 | 84.3 |
| Held Fire in Check | 118 | 13.2 | 32 | 16.8 | 4 | 154 | 13.7 |
| Total Satisfactory | 880 | 98.5 | 190 | 96.6 | 28 | 1098 | 98.0 |
| Unsatisfactory | 13 | 1.5 | 8 | .4 | 1 | 22 | 2.0 |
| Total | 893 | 100.0 | 198 | 100.0 | 29 | 1120 | 100.0 |

*International.*

**This fire started in the basement and spread with great rapidity through the combustible stock, excelsior and other packing material in the furniture store. The fire spread to adjoining structures and ignited two automobiles on the opposite side of the 75 ft. street.**

## Point of Origin of Mercantile Fires.

| | No. of Fires | Per Cent of Total of Known Origin |
|---|---|---|
| Stockroom | 411 | 22.4 |
| Basement (fires not otherwise classified) | 350 | 19.1 |
| Salesroom | 345 | 18.8 |
| Boiler room | 129 | 7.0 |
| Work room or shop | 92 | 5.0 |
| Outside—exposure | 90 | 4.9 |
| Packing and shipping room | 78 | 4.3 |
| Elevator or vent shaft | 53 | 2.9 |
| Office | 48 | 2.6 |
| Hallway | 44 | 2.4 |
| Wastepaper room or chute | 42 | 2.3 |
| Show window | 33 | 1.8 |
| Attic | 21 | 1.1 |
| Toilet | 19 | 1.0 |
| Roof | 11 | .6 |
| Locker room | 9 | .5 |
| Miscellaneous | 60 | 3.3 |
| Total of known point of origin | 1835 | 100.0 |
| No data as to point of origin | 599 | |
| Total | 2434 | |

# Dry Goods Stores.

**Total Number of Fires Reported, 425.**

In this group the causes of fire fall in approximately the same order as for the entire mercantile class. One special hazard is prominent; electric irons having caused more than ten per cent of the fires in the group. Sprinkler operation was satisfactory in 97.9 per cent of the sprinklered fires.

## Classification of Causes.

| Cause | | No. of Fires | Per Cent of Total Known Causes |
|---|---|---|---|
| Matches—smoking | | 61 | 24.5 |
| Ignition of rubbish or litter | | 47 | 18.9 |
| Probably smoking | 19 | | |
| Unknown | 28 | | |
| Electrical causes | | 38 | 15.3 |
| Electric iron left on | | 28 | 11.2 |
| Spontaneous ignition | | 20 | 8.0 |
| Oily material | 7 | | |
| Rubbish and litter | 6 | | |
| Painters' materials | 4 | | |
| Pyroxylin material | 2 | | |
| Soft coal | 1 | | |
| Defective or overheated heating equipment | | 19 | 7.7 |
| Stoves and furnaces | 15 | | |
| Oil-burning equipment | 4 | | |
| Exposure | | 18 | 7.2 |
| Heat from gas appliances | | 5 | 2.0 |
| Incendiary | | 4 | 1.6 |
| Mechanic's torch | | 4 | 1.6 |
| Flammable liquids, ignition of | | 3 | 1.2 |
| Other known causes | | 2 | .8 |
| Total known causes | | 249 | 100.0 |
| Unknown—suspicious | | 13 | |
| Unknown | | 163 | |
| Total | | 425 | |

## Analysis of Loss.

| | Sprinklered Fires | Per Cent | Unsprinklered Fires | Per Cent | Total | Per Cent |
|---|---|---|---|---|---|---|
| Small loss | 203 | 70.2 | 20 | 14.7 | 223 | 52.5 |
| Large loss* | 84 | 29.1 | 115 | 84.6 | 199 | 46.8 |
| No data | 2 | .7 | 1 | .7 | 3 | .7 |
| Total | 289 | 100.0 | 136 | 100.0 | 425 | 100.0 |

*Large loss fires are those involving loss of $5000 or over.

## Sprinkler Fire Record.

| Effect of Sprinklers | No. of Fires | Per Cent |
|---|---|---|
| Extinguished Fire | 218 | 87.5 |
| Held Fire in Check | 26 | 10.4 |
| Total Satisfactory | 244 | 97.9 |
| Unsatisfactory | 5 | 2.1 |
| Total | 249 | 100.0 |

There were 40 fires in sprinklered property in which no sprinklers operated.

| No. of Heads Opening | No. of Fires | Per Cent |
|---|---|---|
| 1 | 109 | 43.8 |
| 2 | 59 | 23.7 |
| 3 | 29 | 11.6 |
| 4 | 23 | 9.3 |
| 5 | 9 | 3.6 |
| 6-9 | 11 | 4.4 |
| 10-25 | 5 | 2.0 |
| Over 50 | 4 | 1.6 |
| Total | 249 | 100.0 |

### Comparison of Wet and Dry Systems.

| | Wet System | Per Cent | Dry System | Per Cent | No Data | Total | Per Cent |
|---|---|---|---|---|---|---|---|
| Extinguished Fire | 192 | 86.8 | 23 | 95.9 | 3 | 218 | 87.5 |
| Held Fire in Check | 24 | 10.8 | 1 | 4.1 | 1 | 26 | 10.4 |
| Total Satisfactory | 216 | 97.6 | 24 | 100.0 | 4 | 244 | 97.9 |
| Unsatisfactory | 5 | 2.4 | 0 | 0.0 | 0 | 5 | 2.1 |
| Total | 221 | 100.0 | 24 | 100.0 | 4 | 249 | 100.0 |

## Point of Origin of Fires.

| | No. of Fires | Per Cent of Total of Known Origin |
|---|---|---|
| Salesroom | 95 | 27.1 |
| Stockroom | 83 | 24.4 |
| Basement (fires not otherwise classified) | 55 | 15.7 |
| Work room | 32 | 9.1 |
| Boiler room | 15 | 4.3 |
| Waste paper room or chute | 14 | 4.0 |
| Outside—exposure | 14 | 4.0 |
| Packing or shipping room | 10 | 2.9 |
| Hallway | 8 | 2.3 |
| Show window | 6 | 1.7 |
| Elevator or vent shaft | 6 | 1.7 |
| Toilet | 5 | 1.3 |
| Office | 4 | 1.0 |
| Transformer room | 2 | .5 |
| Total of known origin | 349 | 100.0 |
| No data as to origin | 75 | |
| Total | 424 | |

# Furniture Stores.

**Total Number of Fires Reported, 280.**

## Classification of Causes.

| Cause | | No. of Fires | Per Cent of Total Known Causes |
|---|---|---|---|
| Matches—smoking | | 32 | 18.5 |
| Electrical causes | | 31 | 17.9 |
| Ignition of rubbish or litter | | 24 | 13.9 |
| Probably smoking | 11 | | |
| Sparks from boiler | 6 | | |
| Unknown | 7 | | |
| Spontaneous ignition | | 23 | 13.2 |
| Oily material | 13 | | |
| Rubbish and litter | 6 | | |
| Painters' materials | 2 | | |
| Packing material | 2 | | |
| Defective or overheated heating equipment | | 22 | 12.7 |
| Stoves and furnaces | 17 | | |
| Oil-burning equipment | 5 | | |
| Exposure | | 19 | 11.0 |
| Defective chimneys and flues | | 7 | 4.0 |
| Electric iron left on | | 3 | 1.7 |
| Incendiary | | 3 | 1.7 |
| Other known causes | | 9 | 5.4 |
| Total known causes | | 173 | 100.0 |
| Unknown—suspicious | | 3 | |
| Unknown | | 104 | |
| Total | | 280 | |

## Point of Origin of Fires.

| | No. of Fires | Per Cent of Total of Known Origin |
|---|---|---|
| Stockroom | 44 | 20.0 |
| Basement (fires not otherwise classified) | 38 | 17.3 |
| Boiler room | 30 | 13.6 |
| Salesroom | 27 | 12.3 |
| Packing and shipping room | 19 | 8.6 |
| Outside—exposure | 17 | 7.7 |
| Shop or repair room | 14 | 6.4 |
| Show window | 8 | 3.6 |
| Waste paper room or chute | 7 | 3.2 |
| Elevator shaft | 7 | 3.2 |
| Office | 5 | 2.3 |
| Attic | 2 | .9 |
| Roof | 2 | .9 |
| Total of known origin | 220 | 100.0 |
| No data as to origin | 60 | |
| Total | 280 | |

*International.*

**A typical fire in an old mercantile block in a small city. Without automatic sprinklers and with no protection of vertical openings, fires spread rapidly through structures of this type.**

## Sprinkler Fire Record.

| Effect of Sprinklers | No. of Fires | Per Cent |
|---|---|---|
| Extinguished Fire | 96 | 82.7 |
| Held Fire in Check | 17 | 14.7 |
| Total Satisfactory | 113 | 97.4 |
| Unsatisfactory | 3 | 2.6 |
| Total | 116 | 100.0 |

There were 36 fires in sprinklered property in which no sprinklers operated.

| No. of Heads Opening | No. of Fires | Per Cent |
|---|---|---|
| 1 | 60 | 51.7 |
| 2 | 27 | 23.3 |
| 3 | 10 | 8.6 |
| 4 | 6 | 5.2 |
| 5 | 3 | 2.6 |
| 6-9 | 4 | 3.4 |
| 10-25 | 5 | 4.3 |
| 26-50 | 1 | .9 |
| Total | 116 | 100.0 |

### Comparison of Wet and Dry Systems.

| | Wet System | Per Cent | Dry System | Per Cent | No Data | Total | Per Cent |
|---|---|---|---|---|---|---|---|
| Extinguished Fire | 81 | 86.2 | 12 | 66.6 | 3 | 96 | 82.7 |
| Held Fire in Check | 13 | 13.8 | 3 | 16.7 | 1 | 17 | 14.7 |
| Total Satisfactory | 94 | 100.0 | 15 | 83.3 | 4 | 113 | 97.4 |
| Unsatisfactory | 0 | .0 | 3 | 16.7 | 0 | 3 | 2.6 |
| Total | 94 | 100.0 | 18 | 100.0 | 4 | 116 | 100.0 |

### Analysis of Loss.

| | Sprinklered Fires | Per Cent | Unsprinklered Fires | Per Cent | Total | Per Cent |
|---|---|---|---|---|---|---|
| Small loss | 132 | 86.9 | 12 | 9.4 | 144 | 51.4 |
| Large loss* | 20 | 13.1 | 112 | 87.6 | 132 | 47.2 |
| No data | 0 | .0 | 4 | 3.0 | 4 | 1.4 |
| Total | 152 | 100.0 | 128 | 100.0 | 280 | 100.0 |

*Large loss fires are those causing a loss of $5000 or over.

## Groceries.

**Total Number of Fires Reported, 302.**

More special hazards prevail in groceries than in the ordinary mercantile due to the character of products handled. The hazard of coffee roasting is the most prominent of these and was responsible for 11.1 per cent of the grocery store fires. Three fires resulted from the hazard of peanut roasting, and five gas explosions were reported. Sprinkler performance was satisfactory in 132 of the 135 fires in which sprinklers were a factor.

### Classification of Causes.

| Cause | | No. of Fires | Per Cent of Total Known Causes |
|---|---|---|---|
| Matches—smoking | | 33 | 17.4 |
| Electrical causes | | 29 | 15.3 |
| Coffee roaster or vent ducts | | 21 | 11.1 |
| Defective stoves and furnaces | | 20 | 10.7 |
| Rubbish ignited | | 18 | 9.6 |
| Probably smoking | 10 | | |
| Unknown | 8 | | |
| Incendiary | | 14 | 7.4 |
| Spontaneous ignition | | 10 | 5.3 |
| Rubbish | 3 | | |
| Oily material | 3 | | |
| Sacked sugar | 2 | | |
| Painters' materials | 1 | | |
| Soft coal | 1 | | |
| Exposure | | 8 | 4.2 |
| Power transmission | | 6 | 3.2 |
| Gas explosions | | 5 | 2.6 |
| Coffee roasting machine | 3 | | |
| Banana ripener | 1 | | |
| Gas heater | 1 | | |
| Defective chimneys or flues | | 4 | 2.1 |
| Peanut roasting | | 3 | 1.6 |
| Other known causes | | 18 | 9.5 |
| Total known causes | | 189 | 100.0 |
| Unknown | | 113 | |
| Total | | 302 | |

*International.*

**All that was left of a four-story frame mercantile building 200 ft. long. Unsprinklered large area mercantile buildings of combustible construction, particularly where located in small cities having limited fire fighting facilities, are subject to heavy losses.**

## Sprinkler Fire Record.

| Effect of Sprinklers | No. of Fires | Per Cent |
|---|---|---|
| Extinguished Fire..... | 101 | 74.8 |
| Held Fire in Check..... | 31 | 23.0 |
| Total Satisfactory..... | 132 | 97.8 |
| Unsatisfactory ..... | 3 | 2.2 |
| Total ..... | 135 | 100.0 |

There were 40 fires in sprinklered property in which sprinklers did not operate.

| No. of Heads Opening | No. of Fires | Per Cent |
|---|---|---|
| 1 | 64 | 47.4 |
| 2 | 22 | 16.3 |
| 3 | 17 | 12.6 |
| 4 | 6 | 4.4 |
| 5 | 4 | 3.0 |
| 6-9 | 8 | 5.9 |
| 10-25 | 10 | 7.5 |
| Over 50 | 3 | 2.2 |
| No data | 1 | .7 |
| Total | 135 | 100.0 |

### Comparison of Wet and Dry Systems.

| | Wet System | Per Cent | Dry System | Per Cent | No Data | Total | Per Cent |
|---|---|---|---|---|---|---|---|
| Extinguished Fire..... | 49 | 69.0 | 48 | 80.0 | 4 | 101 | 74.9 |
| Held Fire in Check..... | 21 | 29.6 | 10 | 16.7 | 0 | 31 | 22.9 |
| Total Satisfactory..... | 70 | 98.6 | 58 | 96.7 | 4 | 132 | 97.8 |
| Unsatisfactory ..... | 1 | 1.4 | 2 | 3.3 | 0 | 3 | 2.2 |
| Total ..... | 71 | 100.0 | 60 | 100.0 | 4 | 135 | 100.0 |

### Analysis of Loss.

| | Sprinklered Fires | Per Cent | Unsprinklered Fires | Per Cent | Total | Per Cent |
|---|---|---|---|---|---|---|
| Small loss | 155 | 88.6 | 22 | 17.3 | 177 | 58.6 |
| Large loss* | 19 | 10.8 | 105 | 82.7 | 124 | 41.1 |
| No data | 1 | .6 | 0 | .0 | 1 | .3 |
| Total | 175 | 100.0 | 127 | 100.0 | 302 | 100.0 |

*Large loss fires are those involving a loss of $5000 or over.

### Point of Origin of Fires.

| | No. of Fires | Per Cent of Total of Known Origin |
|---|---|---|
| Stockroom | 50 | 22.9 |
| Basement (fires not otherwise classified) | 31 | 14.2 |
| Kitchen or roasting room | 29 | 13.2 |
| Salesroom | 20 | 9.2 |
| Refrigerating plant | 14 | 6.4 |
| Boiler | 14 | 6.4 |
| Office | 13 | 6.0 |
| Packing or shipping room | 11 | 5.0 |
| Outside—exposure | 10 | 4.6 |
| Roof | 5 | 2.3 |
| Waste paper room or chute | 4 | 1.7 |
| Attic or loft | 4 | 1.7 |
| Miscellaneous | 14 | 6.4 |
| Total of known origin | 219 | 100.0 |
| No data as to origin | 83 | |
| Total | 302 | |

## General Stores.

**Total Number of Fires Reported, 84.**

General stores are the typical stores of the rural districts. Such stores are frequently victims of poor housekeeping, inferior electrical wiring and equipment, and all too often are the victims of incendiary fires. Once the general store starts to burn a total loss usually results due either to inadequate fire protection or inferior construction. Losses of over $5000 were reported in 86.9 per cent of the fires in this class.

**Sprinkler Fire Record.**

Two fires occurred in sprinklered property. One of these was an exposure fire which was prevented from entering the building by the operation of an open sprinkler system. None of the automatic sprinklers in the building operated. In the other five two heads on a dry system operated and held the fire in check.

Starting in a barrel of waste material at the base of a rubbish chute, this fire spread rapidly to upper floors by means of unprotected openings on each floor.

## Classification of Causes.

| Cause | No. of Fires | Per Cent of Total Known Causes |
|---|---|---|
| Electrical causes | 9 | 24.4 |
| Incendiary | 7 | 18.9 |
| Defective stoves and furnaces | 6 | 16.2 |
| Matches—smoking | 5 | 13.5 |
| Defective chimney or flue | 4 | 10.8 |
| Exposure | 2 | 5.4 |
| Gas explosion | 1 | 2.7 |
| Defective oil burners | 1 | 2.7 |
| Spontaneous ignition | 1 | 2.7 |
| Fireworks stock ignited | 1 | 2.7 |
| Total known causes | 37 | 100.0 |
| Unknown—suspicious | 3 | |
| Unknown | 44 | |
| Total | 84 | |

## Analysis of Loss.

| | Sprinklered Fires | Per Cent | Unsprinklered Fires | Per Cent | Total | Per Cent |
|---|---|---|---|---|---|---|
| Small loss | 2 | 100.0 | 9 | 10.9 | 11 | 13.1 |
| Large loss* | .. | .... | 73 | 89.1 | 73 | 86.9 |
| Total | 2 | 100.0 | 82 | 100.0 | 84 | 100.0 |

*Large loss fires are those involving a loss of $5000 or over.

### Point of Origin of Fires.

| | No. of Fires | Per Cent of Total of Known Origin |
|---|---|---|
| Salesroom | 11 | 28.2 |
| Basement | 10 | 25.6 |
| Stockroom | 8 | 20.5 |
| Outside—exposure | 2 | 5.1 |
| Attic | 2 | 5.1 |
| Office | 2 | 5.1 |
| Lunchroom | 1 | 2.6 |
| Show window | 1 | 2.6 |
| Roof | 1 | 2.6 |
| Boiler room | 1 | 2.6 |
| Total of known origin | 39 | 100.0 |
| No data as to origin | 45 | |
| Total | 84 | |

## Hardware Stores.

**Total Number of Fires Reported, 185.**

### Classification of Causes.

| Cause | | No. of Fires | Per Cent of Total Known Causes |
|---|---|---|---|
| Spontaneous ignition | | 29 | 24.4 |
| Oily material | 21 | | |
| Rubbish | 6 | | |
| Painters' material | 2 | | |
| Matches—smoking | | 18 | 15.1 |
| Electrical causes | | 14 | 11.8 |
| Exposure | | 14 | 11.8 |
| Defective or overheated heating equipment | | 13 | 10.9 |
| Stoves and furnaces—coal burning | 6 | | |
| Oil-burning equipment | 5 | | |
| Gasoline stoves | 2 | | |
| Ignition of flammable liquids | | 8 | 6.7 |
| Ignition of rubbish or litter | | 7 | 5.8 |
| Probably smoking | 1 | | |
| Sparks from boiler | 1 | | |
| Unknown | 5 | | |
| Defective chimneys or flues | | 5 | 4.2 |
| Incendiary | | 4 | 3.5 |
| Hot ashes | | 2 | 1.6 |
| Other known causes | | 5 | 4.2 |
| Total known causes | | 119 | 100.0 |
| Unknown causes | | 66 | |
| Total | | 185 | |

## Point of Origin of Fires.

| | No. of Fires | Per Cent of Total of Known Origin |
|---|---|---|
| Stockroom | 29 | 24.1 |
| Basement (fires not otherwise classified) | 25 | 20.8 |
| Salesroom | 15 | 12.5 |
| Outside—exposure | 14 | 11.8 |
| Boiler room | 10 | 8.3 |
| Workshop—machine room | 7 | 5.7 |
| Waste paper room, chute or straw bin | 7 | 5.7 |
| Packing or shipping room | 4 | 3.3 |
| Office | 3 | 2.5 |
| Miscellaneous | 6 | 5.3 |
| Total of known origin | 120 | 100.0 |
| No data as to origin | 65 | |
| Total | 185 | |

## Analysis of Loss.

| | Sprinklered Fires | Per Cent | Unsprinklered Fires | Per Cent | Total | Per Cent |
|---|---|---|---|---|---|---|
| Small loss | 80 | 82.5 | 16 | 18.2 | 96 | 51.9 |
| Large loss* | 16 | 16.5 | 72 | 81.8 | 88 | 47.5 |
| No data | 1 | 1.0 | 0 | .0 | 1 | .6 |
| Total | 97 | 100.0 | 88 | 100.0 | 185 | 100.0 |

*Large loss fires are those involving a loss of $5000 or over.

## Sprinkler Fire Record.

| Effect of Sprinklers | No. of Fires | Per Cent |
|---|---|---|
| Extinguished Fire | 65 | 80.3 |
| Held Fire in Check | 15 | 18.5 |
| Total Satisfactory | 80 | 98.8 |
| Unsatisfactory | 1 | 1.2 |
| Total | 81 | 100.0 |

There were 16 fires in sprinklered property in which sprinklers did not operate.

| No. of Heads Opening | No. of Fires | Per Cent |
|---|---|---|
| 1 | 43 | 53.1 |
| 2 | 16 | 19.7 |
| 3 | 9 | 11.1 |
| 4 | 3 | 3.7 |
| 5 | .. | .. |
| 6-9 | 3 | 3.7 |
| 10-25 | 4 | 5.0 |
| 26-50 | 3 | 3.7 |
| Total | 81 | 100.0 |

### Comparison of Wet and Dry Systems.

| | Wet System | Per Cent | Dry System | Per Cent | No Data | Total | Per Cent |
|---|---|---|---|---|---|---|---|
| Extinguished Fire | 42 | 80.8 | 20 | 80.0 | 3 | 65 | 80.3 |
| Held Fire in Check | 10 | 19.2 | 4 | 16.0 | 1 | 15 | 18.5 |
| Total Satisfactory | 52 | 100.0 | 24 | 96.0 | 4 | 80 | 98.8 |
| Unsatisfactory | 0 | | 1 | 4.0 | 0 | 1 | 1.2 |
| Total | 52 | | 25 | 100.0 | 4 | 81 | 100.0 |

# Shoe Stores.

**Total Number of Fires Reported, 91.**

## Classification of Causes.

| Cause | | No. of Fires | Per Cent of Total Known Causes |
|---|---|---|---|
| Matches—smoking | | 25 | 48.0 |
| Ignition of rubbish or litter | | 6 | 11.6 |
| Probably smoking | 4 | | |
| Unknown | 2 | | |
| Spontaneous ignition | | 4 | 7.6 |
| Oily material | 2 | | |
| Rubbish or litter | 2 | | |
| Electrical causes | | 3 | 5.8 |
| Incendiary | | 3 | 5.8 |
| Defective stoves and furnaces | | 3 | 5.8 |
| Heat from electric light bulb | | 2 | 3.8 |
| Other known causes | | 6 | 11.6 |
| Total known causes | | 52 | 100.0 |
| Unknown—suspicious | | 4 | |
| Unknown | | 35 | |
| Total | | 91 | |

## Analysis of Loss.

| | Sprinklered Fires | Per Cent | Unsprinklered Fires | Per Cent | Total | Per Cent |
|---|---|---|---|---|---|---|
| Small loss | 56 | 86.2 | 6 | 23.1 | 62 | 68.2 |
| Large loss* | 9 | 13.8 | 20 | 76.9 | 29 | 31.8 |
| Total | 65 | 100.0 | 26 | 100.0 | 91 | 100.0 |

*Large loss fires are those involving loss of $5000 or over.

## Sprinkler Fire Record.

| Effect of Sprinklers | No. of Fires | Per Cent |
|---|---|---|
| Extinguished Fire | 47 | 88.7 |
| Held Fire in Check | 6 | 11.3 |
| Total | 53 | 100.0 |

There were 12 fires in sprinklered properties in which sprinklers did not operate.

| No. of Heads Opening | No. of Fires | Per Cent |
|---|---|---|
| 1 | 34 | 64.2 |
| 2 | 9 | 17.0 |
| 3 | 4 | 7.5 |
| 4 | 4 | 7.5 |
| 5 | 1 | 1.9 |
| 6-9 | 1 | 1.9 |
| Total | 53 | 100.0 |

## Comparison of Wet and Dry Systems.

| | Wet System | Per Cent | Dry System | Per Cent | No Data | Total | Per Cent |
|---|---|---|---|---|---|---|---|
| Extinguished Fire | 41 | 89.1 | 5 | 83.3 | 1 | 47 | 88.7 |
| Held Fire in Check | 5 | 10.9 | 1 | 16.7 | 0 | 6 | 11.3 |
| Total | 46 | 100.0 | 6 | 100.0 | 1 | 53 | 100.0 |

*International.*

**The stock of mercantile occupancies is peculiarly susceptible to smoke and water damage. This fire was confined to the basement, but caused heavy damage to the stock on the floors above.**

### Point of Origin of Fires.

| | No. of Fires | Per Cent of Total of Known Origin |
|---|---|---|
| Stockroom | 27 | 43.6 |
| Basement (not otherwise classified) | 17 | 28.4 |
| Salesroom | 4 | 6.4 |
| Packing or shipping room | 3 | 4.7 |
| Hallway | 2 | 3.2 |
| Elevator or vent shaft | 2 | 3.2 |
| Waste paper room | 1 | 1.5 |
| Outside—exposure | 1 | 1.5 |
| Miscellaneous | 5 | 7.5 |
| Total of known origin | 62 | 100.0 |
| No data as to origin | 29 | |
| Total | 91 | |

## Miscellaneous Mercantiles.

**Total Number of Fires Reported, 1067.**

Matches—smoking lead the list of causes of fire in the miscellaneous mercantiles class and ignition of rubbish is in second place. At least a third of the fires in this class originated in the basement, too often a neglected spot in mercantiles. Sprinkler operation was 97.7 per cent satisfactory.

## Classification of Causes.

| Cause | | No. of Fires | Per Cent of Total Known Causes |
|---|---|---|---|
| Matches—smoking | | 143 | 21.8 |
| Ignition of rubbish or litter | | 109 | 16.7 |
| Probably smoking | 66 | | |
| Boiler sparks | 7 | | |
| Unknown | 36 | | |
| Electrical causes | | 97 | 14.8 |
| Defective or overheated heating equipment | | 80 | 12.3 |
| Defective or overheated stoves or furnaces | 54 | | |
| Defective oil-burning equipment | 26 | | |
| Spontaneous ignition | | 65 | 9.9 |
| Oily material | 29 | | |
| Rubbish or litter | 23 | | |
| Painters' materials | 8 | | |
| Soft coal | 4 | | |
| Pyroxylin material | 1 | | |
| Flammable liquids, ignition of | | 31 | 4.7 |
| Exposure | | 29 | 4.4 |
| Defective chimneys and flues | | 20 | 3.1 |
| Incendiary | | 19 | 2.9 |
| Electric iron left on | | 13 | 2.0 |
| Ignition or explosion of gas | | 10 | 1.5 |
| Other known causes | | 38 | 5.9 |
| Total known causes | | 654 | 100.0 |
| Unknown cause—suspicious | | 20 | |
| Unknown cause | | 393 | |
| Total | | 1067 | |

## Point of Origin of Fires.

| | No. of Fires | Per Cent of Total of Known Origin |
|---|---|---|
| Basement (fires not otherwise classified) | 174 | 21.1 |
| Salesroom | 173 | 21.0 |
| Stockroom or storage room | 170 | 20.6 |
| Boiler room | 58 | 7.0 |
| Work room and alteration room | 36 | 4.4 |
| Hallway | 33 | 4.0 |
| Outside or exposure | 32 | 3.9 |
| Elevator and vent shaft | 32 | 3.9 |
| Shipping room | 31 | 3.7 |
| Office | 20 | 2.4 |
| Show window | 14 | 1.7 |
| Attic | 13 | 1.5 |
| Waste paper room or chute | 11 | 1.3 |
| Miscellaneous | 29 | 3.5 |
| Total of known origin | 826 | 100.0 |
| No data as to origin | 241 | |
| Total | 1067 | |

## Analysis of Loss.

| | Sprinklered Fires | Per Cent | Unsprinklered Fires | Per Cent | Total | Per Cent |
|---|---|---|---|---|---|---|
| Small loss | 540 | 89.0 | 76 | 16.5 | 616 | 58.3 |
| Large loss* | 65 | 10.7 | 370 | 80.5 | 425 | 40.2 |
| No data | 2 | .3 | 14 | 3.0 | 16 | 1.5 |
| Total | 607 | 100.0 | 460 | 100.0 | 1067 | 100.0 |

*Large loss fires are those involving loss of $5000 or over.

## Sprinkler Fire Record.

| Effect of Sprinklers | No. of Fires | Per Cent |
|---|---|---|
| Extinguished Fire | 417 | 85.8 |
| Held Fire in Check | 58 | 11.9 |
| Total Satisfactory | 475 | 97.7 |
| Unsatisfactory | 10 | 2.3 |
| Total | 485 | 100.0 |

There were 122 fires in sprinklered property in which sprinklers did not operate.

| No. of Heads Opening | No. of Fires | Per Cent |
|---|---|---|
| 1 | 272 | 56.2 |
| 2 | 106 | 21.8 |
| 3 | 49 | 10.1 |
| 4 | 19 | 3.9 |
| 5 | 7 | 1.4 |
| 6-9 | 13 | 2.7 |
| 10-25 | 14 | 2.9 |
| 26-50 | 2 | .4 |
| Over 50 | 1 | .2 |
| No data | 2 | .4 |
| Total | 485 | 100.0 |

## Comparison of Wet and Dry Systems.

| | Wet System | Per Cent | Dry System | Per Cent | No Data | Total | Per Cent |
|---|---|---|---|---|---|---|---|
| Extinguished Fire | 357 | 87.4 | 50 | 78.2 | 10 | 417 | 86.0 |
| Held Fire in Check | 45 | 10.9 | 12 | 18.8 | 1 | 58 | 12.0 |
| Total Satisfactory | 402 | 98.3 | 62 | 97.0 | 11 | 475 | 98.0 |
| Unsatisfactory | 7 | 1.7 | 2 | 3.0 | 1 | 10 | 2.0 |
| Total | 409 | 100.0 | 64 | 100.0 | 12 | 485 | 100.0 |

# Fires in Which There Was Loss of Life.

Since the publication of the July QUARTERLY, the N.F.P.A. Department of Fire Record has received from various sources 98 reports of fires in which loss of life has occurred. A total of 153 lives were lost in the fires included in this tabulation.

The largest loss of life during the period was the loss of nine seamen due to an explosion and fire aboard the tanker *Raleigh Warner* at Good Hope, La., on July 15, 1932. The blast occurred from an unknown cause while the vessel was tied up at a dock after taking on a cargo of gasoline.

One fire outside of the United States is worthy of mention. Twenty-one children were trampled to death and many others were injured in a panic, following the cry of "fire" when film ignited in the projection booth of the Esmeralda theatre, Talcahuano, Chile, on July 13, 1932. About three hundred children were watching the show when the fire, which was confined to the projection booth, occurred.

## Loss of Life Fires, July-September, 1932

*This is a typical rather than a complete record, presented to show the conditions under which loss of life occurs, that they may be known and guarded against. The total loss of life by fire in the United States is estimated at 10,000 annually.*

| Class of Fire | No. Fires | Lives Lost. Men | Women | Children | No Data | Total |
|---|---|---|---|---|---|---|
| Airplane fires | 7 | 11 | 2 | 0 | 0 | 13 |
| Apartments, hotels, lodgings, tenements, etc. | 6 | 9 | 1 | 3 | 0 | 13 |
| Automobile fires | 12 | 13 | 3 | 4 | 0 | 20 |
| Barns and stables | 2 | 1 | 0 | 1 | 0 | 2 |
| Dwellings—Rural | 18 | 7 | 8 | 13 | 3 | 31 |
| Dwellings—Urban | 25 | 10 | 8 | 11 | 0 | 29 |
| Gasoline-tank truck | 1 | 2 | 0 | 0 | 0 | 2 |
| Industrial occupancies | 1 | 1 | 0 | 0 | 0 | 1 |
| Jails | 2 | 2 | 0 | 0 | 0 | 2 |
| Mining property | 2 | 4 | 0 | 0 | 0 | 4 |
| Motion picture theatres | 1 | 2 | 0 | 0 | 0 | 2 |
| Multiple occupancies | 2 | 2 | 0 | 0 | 0 | 2 |
| Other buildings | 6 | 3 | 1 | 2 | 0 | 6 |
| Other than buildings | 7 | 9 | 0 | 3 | 0 | 12 |
| Response to alarms | 1 | 1 | 0 | 0 | 0 | 1 |
| Ships and boats | 4 | 4 | 0 | 0 | 0 | 4 |
| Tank steamer | 1 | 9 | 0 | 0 | 0 | 9 |
| Total | 98 | 90 | 23 | 37 | 3 | 153 |

This table is made up from reports received by the Department of Fire Record between July 1 and September 30, 1932. A few of the fires included herein occurred prior to July 1, but were not reported until after that date.

# Causes of Loss of Life, July-September, 1932.

*Fatalities classified according to the immediate cause of the loss of life rather than according to the cause of the fire.*

| Cause | Men | Women | Children | No Data | Total |
|---|---|---|---|---|---|
| Airplane fires | 11 | 2 | 0 | 0 | 13 |
| Automobile fires | 13 | 3 | 4 | 0 | 20 |
| Children alone in house | 0 | 0 | 1 | 0 | 1 |
| Children and matches | 0 | 0 | 6 | 0 | 6 |
| Cleaning with gasoline | 0 | 4 | 0 | 0 | 4 |
| Clothing ignited—backfire of oil heater | 0 | 1 | 0 | 0 | 1 |
| Clothing ignited—bonfire | 0 | 0 | 1 | 0 | 1 |
| Clothing ignited—fireworks | 0 | 0 | 1 | 0 | 1 |
| Clothing ignited—hot tar | 1 | 0 | 0 | 0 | 1 |
| Clothing ignited—match | 0 | 1 | 0 | 0 | 1 |
| Clothing ignited—smoking | 4 | 1 | 0 | 0 | 5 |
| Escaping from fire—jumped | 1 | 0 | 0 | 0 | 1 |
| Explosion—dynamite caps | 6 | 0 | 0 | 0 | 6 |
| Explosion—gas well | 2 | 0 | 0 | 0 | 2 |
| Explosion—gasoline stove | 0 | 1 | 4 | 0 | 5 |
| Explosion—gasoline vapor in boat | 3 | 0 | 0 | 0 | 3 |
| Explosion—mine | 4 | 0 | 0 | 0 | 4 |
| Explosion—oil lamp or stove | 1 | 2 | 5 | 0 | 8 |
| Explosion—tank steamer | 9 | 0 | 0 | 0 | 9 |
| Explosion—toy cannon | 1 | 0 | 0 | 0 | 1 |
| Explosion—turpentine | 1 | 1 | 2 | 0 | 4 |
| Fire fighting | 4 | 0 | 0 | 0 | 4 |
| Forest fire fighting | 1 | 0 | 0 | 0 | 1 |
| Gasoline tank truck crash | 3 | 0 | 0 | 0 | 3 |
| Gasoline used to start fire | 1 | 0 | 1 | 0 | 2 |
| Ignition of flammable liquids or vapors | 1 | 1 | 3 | 0 | 5 |
| Kerosene used to start fire | 1 | 1 | 0 | 0 | 2 |
| Motion picture film ignited | 2 | 0 | 0 | 0 | 2 |
| Overcome by smoke—suffocation | 6 | 0 | 0 | 0 | 6 |
| Re-entering burning building | 0 | 1 | 0 | 0 | 1 |
| Response to alarms | 1 | 0 | 0 | 0 | 1 |
| Trapped in burning building | 9 | 3 | 9 | 3 | 24 |
| Trapped while starting incendiary fire | 3 | 0 | 0 | 0 | 3 |
| No data | 1 | 1 | 0 | 0 | 2 |
| Total | 90 | 23 | 37 | 3 | 153 |

# Typical Loss of Life Fires.

### Children and Matches.

L-1667. MONTREAL, P. Q., JULY 12, 1932. Left alone in the house while her older sister went to a near-by store, a two-year-old girl was fatally burned while playing with matches in her crib. The older girl returned and found her sister enveloped in flames. She pulled the child from the crib and extinguished the fire by rolling her on the floor, but not in time to prevent fatal injuries.

L-1666. MONTREAL, P. Q., SEPTEMBER 13, 1932. A small boy was trapped and burned to death in a shed in the rear of his home. The shed contained cardboard boxes, and firemen stated that the boy undoubtedly ignited the boxes while playing with matches.

**Cleaning with Gasoline.**

L-1668. DUNKIRK, N. Y., JUNE 12, 1932. One woman lost her life and another was severely burned by an explosion of fumes from gasoline in which they were washing clothes. The two women were working in the cellar and had a tub filled with a mixture of gasoline and water. All of the windows were closed and the fumes which accumulated were ignited either by a spark from an adjacent electric washing machine or from a static spark generated when the clothing was run through a wringer. The resultant explosion blew out the concrete block walls of the cellar and set fire to the house.

L-1669. LINCOLN, NEB., JUNE 24, 1932. One woman was killed and another seriously burned as the result of an explosion which occurred when they were cleaning blankets in high test gasoline or naphtha. The two women were standing at opposite sides of an electric washer and the explosion occurred when one of them turned on the current.

L-1670. MOUNT NEBO, PA., JULY 17, 1932. A man was fatally burned when his clothing ignited while he was cleaning the engine of his automobile with gasoline. The burns resulted from the ignition of gasoline fumes by a short circuit.

L-1671. ELKHORN, IND., AUGUST 6, 1932. A woman was fatally burned in an explosion and fire which occurred in the basement laundry in her home as a result of cleaning clothing with gasoline. The explosion, which was severe, occurred when the clothes were run through the wringer of an electric washing machine. Before assistance came the woman's clothing had been completely burned.

L-1672. GREEN BAY, WIS., AUGUST 12, 1932. An explosion occurred in a basement where a woman had just finished cleaning some clothing in a tub of gasoline. The blast occurred when the woman threw two matches which she found on the floor into the open door of the furnace. The matches evidently ignited gasoline fumes which exploded, jarring the building from its foundations and burning the clothing from the woman's body.

**Motion Picture Projection Booth Fire.**

H-35360. CONWAY, S. C., JULY 9, 1932. Two operators in the projection booth of a motion picture theatre were burned to death when fire broke out in the booth. The fire occurred during a show when a delivery boy bringing the operators drinks from a soda fountain entered the booth with a lighted cigarette which ignited the film.

**Clothing Ignited from Bonfire.**

L-1673. QUINCY, MASS., AUGUST 22, 1932. A five-year-old girl died in the hospital of burns received while playing around a bonfire in front of her home.

**Flammable Liquids.**

L-1681. REVERE, MASS., AUGUST, 16, 1932. An explosion of turpentine which the father intended to use for a liniment cost the lives of a family of four. The turpentine in a container had been put on the stove to heat. It burst into flames and the father seized the dish from the stove. Just as he was throwing it out the window it exploded with terrific force, igniting the clothing of the parents and of the two children who were eating in the kitchen. The explosion shattered the two kitchen windows and burned the paint from the woodwork in the room, but with such quickness that the building was not ignited.

**Gasoline Stove Explosion.**

L-1679 NATICK, MASS., AUGUST 9, 1932. A year-old child was fatally burned in his crib and his parents were critically burned by an explosion of a gasoline stove. The tank of the stove had been filled with gasoline preparatory to cooking breakfast and a match ignited fumes in the room. The family lived in a one-room cottage, which was wrecked.

**Gasoline Used to Start Fire.**

L-1677. AGRICOLA, VA., JULY 27, 1932. A sixteen-year-old girl was burned to death when she used gasoline in an attempt to kindle a fire. The explosion which resulted set fire to the house, which was destroyed.

**Kerosene Used to Start Fire.**

L-1678. BROCKTON, MASS., AUGUST 1, 1932. A man was fatally burned in a flash that occurred when kerosene he was using to light a fire in a stove at his home exploded. Oil soaked working clothes which he wore contributed to the fatal effects of the fire. His wife received burns in pulling him from the burning kitchen.